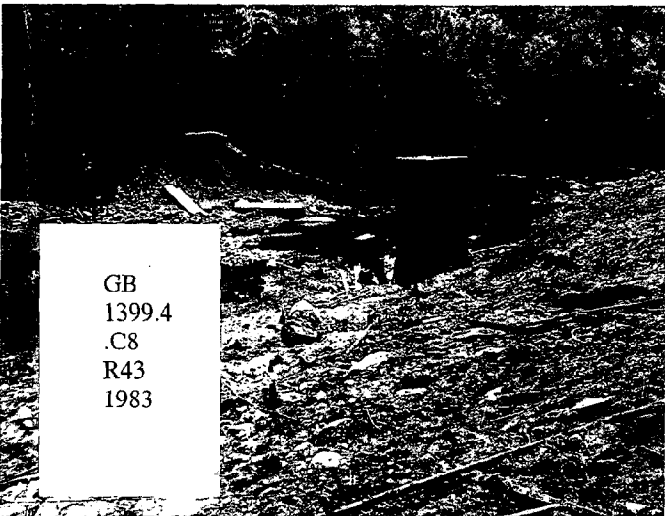


REALIZING THE RISK:

A HISTORY OF THE JUNE 1982 FLOODS IN CONNECTICUT



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1983



CHRONOLOGY OF SIGNIFICANT EVENTS

FRIDAY, JUNE 4

- o Boston WSO issued weather forecast for weekend rain, heavy at times
- o NEREC issued weekend "Flood Potential Outlook" about 3 pm
- o Light rain began about 8 pm
- o Heavy rain began about 11 pm

SATURDAY, JUNE 5

- o Boston WSO issued "Urban Small River and Stream Flood Advisory" about 4 am
- o NEREC issued "Flood Warning" for Yantic River about 6 am
- o Hartford WSO advised of possible flooding in eastern Connecticut at 6 am
- o NEREC issued flood warning for southern New England at 11 am
- o Thousands of residents requested assistance from local fire departments to pump-out flooded basements
- o Local flooding began in late morning and early afternoon
- o State police, State DOT, and local police and officials began barricading local roads and bridges as they flooded or threatened to flood
- o OCP Emergency Operations Center activated at 4:30 pm
- o Towns began issuing evacuation warnings for residents of flood-prone areas
- o Seven people died in flood-related incidents throughout the day
- o Essex began evacuating Falls River area about 10 pm
- o Milford City Hall flooded by Wepawaug River about 10 pm
- o NEREC offices in Bloomfield relocated because of basement flooding about 11 pm

SUNDAY, JUNE 6

- o Bushy Hill Dam on Falls River in Essex burst about 12:30 am
- o Governor ordered National Guard to assist in emergency activities
- o Four people died in flood-related incidents
- o NEREC offices returned to normal operation about 1 pm
- o Dept of Health Services urged residents of flooded areas to boil drinking water and toss out flood-damaged food
- o More than 1,300 people evacuated from their homes on Saturday and Sunday, and emergency shelters established by individual towns, the Red Cross and the Salvation Army
- o DEP issued "no contact" notices for water bodies contaminated by discharges from damaged or overloaded sewerage systems

MONDAY, JUNE 7

- o Governor O'Neill declared a state of emergency and announced he would seek federal assistance
- o Towns began reporting estimates of flood losses to OCP; State agencies began preparing estimates of flood damages
- o Governor toured damaged areas by helicopter
- o DOT reported that it had reopened 40 of the 70 sections of State roads that had been closed on Saturday and Sunday
- o DOT signed no-bid contracts with construction companies to begin removing debris from damaged bridges

TUESDAY, JUNE 8

- o NFIP office opened in New Haven to process claims for flood insurance

WEDNESDAY, JUNE 9

- o Governor sent telegram to President informing him of intent to seek Federal disaster declaration
- o SCS began letting contracts for emergency stream stabilization work

THURSDAY, JUNE 10

- o OCP estimated flood damages at \$276.7 million: \$204,691 for private, non-agricultural damages; \$2.5 for agricultural damages; and \$69,491 for public damages
- o Governor submitted written request for disaster declaration

SATURDAY, JUNE 12

- o Corps of Engineers began inspecting dams for flood damage

MONDAY, JUNE 14

- o President Reagan approved request for disaster declaration: Individual Assistance for all of Connecticut; Public Assistance for New London, Middlesex, New Haven, and Fairfield Counties

(CONTINUED ON INSIDE BACK COVER)

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GB1399.4.C8R43 1983

Honorable William A. O'Neill, Governor of Connecticut

Stanley J. Pac, Commissioner of the Department of
Environmental Protection

Hugo F. Thomas, State Geologist
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1983

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Water Resources Unit
David Curtis, National Weather Service, Northeast River Forecast Center
Paul Gibb, Connecticut Office of Civil Preparedness
Stuart Mahler, Connecticut Office of Policy and Management

This report was prepared under the direction of Larry R. Johnston, with the assistance of Judith A. Singer, consulting Geologist/Hydrologist. Ms. Singer conducted most of the interviews with municipalities and prepared the municipal maps. Mr. Johnston conducted the interviews with State and Federal agencies and prepared the final text.

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SUMMARY

On the weekend of June 5-6, 1982, Connecticut suffered its worst flooding since 1955. Heavy rainfall and flooding were widespread throughout the State, but were most severe in south central Connecticut where up to 16 inches of rain fell in about 48 hours, with most rainfall occurring during a 24 hour period. Floods and flashfloods occurred on most of the small and medium size streams. New peak flows were established for many streams and flood frequency recurrence intervals of 200 years and greater were common in small basins. Large rivers, such as the Connecticut and Housatonic, experienced only minor flooding.

Flooding on many of the smaller rivers was made much worse by the full or partial failure of one or more dams. The most dramatic and concentrated damage in the State occurred when the Bushy Hill Dam in Deep River burst, sending a wall of water down the Falls River that caused or contributed to the failure of six other dams and devastated the Centerbrook and Ivoryton sections of Essex. Throughout the State, 17 dams failed and another 31 were damaged. No flood control structures were damaged. The Corps of Engineers estimated that its flood control structures prevented \$160,573,000 in flood damages.

Although the National Weather Service provided advance warning of the potential for flash floods, the weather advisories and bulletins issued did not indicate the seriousness of the flooding that was to occur. With the notable exception of Norwich, town officials did not have information that would lead them to issue evacuation notices much in advance of the actual flooding. In most cases, town officials relied upon past experience and monitoring of rising waters in local streams. As a result, emergency actions by local officials were very effective in saving lives and preventing injuries, but were largely ineffective in reducing property damages. Of the eleven people that died from flood-related causes, most were the result of careless actions: either rafting down flood swollen streams or crossing flooded bridges. Improvements in Federal, State, and local procedures for identifying flash flood potential and local procedures for providing residents with information on proper preparedness actions could result in fewer losses from future floods.

Damages to public and private property were extensive, with communities in Middlesex and New Haven Counties suffering the greatest losses. Roads and bridges were the most obvious casualties. About 70 sections of State roads were temporarily closed because of washouts; destroyed or damaged bridges; and water, silt or debris on the roads. Seventeen State bridges had to be replaced and another 29 repaired. Hundreds of sections of municipal roads were damaged, and more than two dozen local bridges were destroyed or severely damaged. Much of the road damage was caused by erosion from torrential runoff and embankment failures due to saturated soils. Bridges and culverts that failed were mostly undersized and constructed before current standards were adopted.

The State-owned railroad system was also severely damaged: the mainline Conrail system in West Haven, sections of the Waterbury Branch between Milford and Waterbury, and the Valley Railroad from Essex to Haddam. Amtrak lines were washed out in several places between New Haven and New London. Damages to other public property were relatively modest. The greatest damages to State property were to State parks and forests where sections of roads, bridges and beaches were washed out. Additional municipal losses were primarily to recreational facilities, several municipal sewerage systems, and drainage systems. Waste discharges from damaged or disrupted sewerage systems required issuance of "no-contact" notices for several rivers and harbors and the temporary closing of shellfish beds in some communities.

More than 15,000 homes were damaged, most suffering only minor basement flooding. About 1,500 homes received moderate damage and 37 were destroyed, including 25 in Essex. Over 400 commercial and industrial business establishments were damaged. Most business losses were minor, but individual losses reached as high as \$15 million. Additional private property losses included dams, automobiles, boats, and water, telephone and electrical systems.

Total damages were initially estimated at \$276.7 million, including \$204.7 to homes, businesses and other private property, \$2.5 to agriculture, and \$69.5 to public property. Connecticut was declared a major disaster area by the President (the entire State for Individual Assistance and the four southern counties for Public Assistance), making available a number of Federal

financial assistance programs for individuals and businesses and Federal reimbursement of 75% of eligible flood losses for State and municipal property in the southern counties. The State enacted emergency flood relief legislation to pay the 25 percent non-Federal share of public disaster assistance in the southern counties and 25 percent of losses to public property in the four northern counties. Over 4,000 individuals seeking financial assistance registered at Disaster Assistance Centers. One hundred and fourteen units of local government, two nonprofit organizations, and nine State agencies received full or partial reimbursement for their losses through Federal and State financial assistance programs. Revised estimates of flood losses were prepared only for public property and agriculture; no updated estimates were made for damages to homes, businesses, and other private property. Based on the revised estimates, total flood losses appear to be between \$230 and \$240 million.

Eighteen months after the floods, recovery was largely complete, though still proceeding. Most of the remaining work involved replacement of temporary bridge repairs with permanent new structures and minor road, bridge, and culvert repairs. Final inspections and audits of public restoration projects may not be completed for another year. Several privately-owned dams were still being repaired or rebuilt. Two families still remained in temporary housing provided through a Federal/State program. Several potential flood control projects were under study by the Corps of Engineers and Soil Conservation Service in cooperation with the Connecticut Department of Environmental Protection. State agencies had initiated a number of measures to more clearly identify areas at risk of flooding, improve local flood warning programs, provide technical assistance to towns and businesses, and improve disaster response procedures.

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CHAPTER 1

HYDROLOGY AND METEOROLOGY

Heavy Rain Floods Homes, Forces Road Closings

Continued from Page 1

temporary refuge in an emergency shelter at the Sheridan Middle school — until the storm knocked it power to the school. Residents who could not find temporary lodgings with friends or relatives were then moved to the Goffe Street Armory, mayor's aide Cindy DiTallo said. The Connecticut National Guard moved heavy equipment into New Haven late Saturday as city officials prepared for possible additional flooding. Gov. William A. O'Neill supervised state civil preparedness operations from Camp O'Neill in East Lyme Saturday afternoon and from the state armory in Hartford Saturday night. O'Neill said 1,046 National Guardsmen are on routine weekend

feet, flooding the Norwichtown Mall and nearby homes. Norwich civil defense workers spent Saturday erecting sandbag barricades along the river to attempt to stem the

New Haven Mayor Lito reported a "problem" in the city caused by the West River. The first floors of some cars were merged, he said.

United Illuminating Co. vides electrical greater New Haven turning off power in New Haven, W. Haven and North

merged electrical

The weather service also continued an urban small river and stream flood warning through Sunday

defense officials across the state were warily marking the water levels in rivers late Saturday as

inches in Providence, R.I.

In addition to flooding along the Yantic, Naugatuck and West riv-

Rain Swamps State Homes Evacuated, Roads Closed

By EDMUND MAHONY and DAVID H. RHINELANDER
Courant Staff Writers

A driving storm paused on its march up the East Coast Saturday, soaking southern New England with a record rainfall, flooding houses and vacation of more than the state. Heavy rain is Monday.

er Service in Windsor ord of 4.18 inches of rain Airport for the 24-hour sturday. The previous re-

in June was 3.72 inches

ere were searching for a into the Wharton Brook

le tubing.

as riding on a large inner when it was punctured by he other three were reser-

iver, but Poggio had not ended the search at 7:45

ere were investigating an

was not known whether anyone was in the canoe when it capsized.

Torrential rains were blamed for an accident that killed five Burrillville, R.I., youths about midnight Friday in Burrillville. The teenagers' car was swept of the road by high winds and rain and hit a tree, killing five of six youths in the car, Burrillville police officer Thomas Brissette said.

About 500 people in Naugatuck and 400 in Ansonia were evacuated to schools and armories as the Naugatuck River overflowed its banks, state civil defense officials said. Both communities declared states of emergency. Armories in New Haven, Norwich and New Britain also were opened for evacuees.

The Park River in Hartford was approaching flood stage Saturday night and authorities were preparing for the possible evacuation of residents near both the north and south branches.

In New Haven, about 35 people forced from their homes by flooding along the West River took

Said worst rainstorm of this century

By ROBERT HAMILTON
Staff Writer

Roaring flood waters knocked out phones and electrical power, closed factories, threatened bridges, filled cellars, and tore up riverbanks and roadsides in the Windham area over the weekend, during the worst spring rainstorm this century.

Several families along Old Willimantic Road in Franklin were forced to abandon their homes today as the receding floodwaters exposed a broken sewer system in that area of town. Health

officials

this

stayin

All

invest

Willin

likely

the W

river.

Pepe Jr.,

as he stood

on his front

porch

Willin

in the Westville

section this

afternoon

looking at

West Rock

Avenue, which

borders the

West River.

Most of

the water

had receded,

but

one car

was overturned

and another

was wedged

up against

a van that

had

two wheels

three feet

off the ground.

resting

precariouly

on a rickety

fence.

sets of

asphalt were

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about,

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and soil

had been

washed

away in

many

spots.

Late

Saturday

afternoon,

the river

had

extended

itself as

far as

Mr. Pepe's

basement,

coming

within

a few

inches

May.

of the

first

floor.

"You

just

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up

recore

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cellar

door,

and

there

it was,"

he

chapel

said.

His

mother

and

sister

were

evacu-

Rain-Swollen Rivers Turn Streets Into Torrents

By MATTHEW L. WALD

Special to The New York Times

NEW HAVEN, June 6 — "It was like an extension of the river," said Peter Pepe Jr., as he stood on his front porch looking at West Rock Avenue, which borders the West River.

Most of the water had receded, but one car was overturned and another was wedged up against a van that had two wheels three feet off the ground, resting precariouly on a rickety fence. Sets of asphalt were littered about, and the top 12 inches of the ripavement and soil had been washed away in many spots.

Late Saturday afternoon, the river had extended itself as far as Mr. Pepe's basement, coming within a few inches May. of the first floor. "You just opened up recore the cellar door, and there it was," he chapel said. His mother and sister were evacu-

In hundreds of spots around the state, "rivers" so small that they hardly deserve the title were turned into danger spots.

In New Haven, Vernon Britton said that by 4 P.M. Saturday the sound from the street outside his house was "like the beach."

"I've been here 20 years, and I've never seen it like this," he said, pointing to toppled telephone poles, wrecked cars, and other debris strewn around the neighborhood. Mr. Britton left in the afternoon; Saturday night, the Fire Department evacuated some of his neighbors with the aid of ropes, so that they would not be swept away by the current.

Cars Carried for Blocks

In addition to the West River, which picked cars out of adjacent parking lots and carried them for blocks, the Little River in Naugatuck, 14 miles to the south, turned into a torrent

car, the vehicle floated away in the current, crashed through a low stone wall and landed in a ditch where it remained this afternoon, windshield smashed and driver's seat covered with chunks of pavement.

Neighborhood Is Evacuated

Shortly afterward, the neighborhood was evacuated by National Guardsmen. Mr. Johnson and his father elected to stay, however, and protect their home. The water had already filled the basement. The father kept his loaded shotgun handy in case of looters, and made preparations in case the water should rise more. "We were going to take to the high ground. I had a survival kit — blankets, cans of stereo — I don't know if it would have done any good," he said.

For that neighborhood, this weekend's flooding is the worst residents have seen. But at the same time in

despite extensive flood precautions. The Naugatuck River has been dammed and deepened, and although it overflowed its banks in places, it did not pose any major threat.

The National Guard quickly rolled out huge trucks capable of evacuating people over flooded roads, and the Red Cross opened shelters convenient to the affected areas. But there was little that individual homeowners could do to protect themselves.

Insurance on Floods Is Offered by the U.S.

Flood insurance, which is not normally available on the commercial market, is provided by the Federal

RAINFALL

During the first week of June 1982 a large low pressure system formed over the Gulf states and moved up the east coast. The system stalled over the Virginia/Maryland coast on Saturday, June 5, and its east-northeasterly flow of air brought a large supply of moisture off the Atlantic Ocean resulting in prolonged and heavy rainfall throughout southern New England. The system gradually moved offshore and further up the coast. By Sunday afternoon, June 6, it was located about 150 miles southeast of Cape Cod.

Long Island, Rhode Island and Massachusetts also experienced heavy rainfall and flooding from this weather system, but Connecticut was hardest hit. It was the worst spring rainstorm to affect Connecticut this century, with total rainfall surpassing any storm not associated with a hurricane or tropical storm since the National Weather Service began keeping records in 1904. New rainfall and stream discharge records were established in many areas of Connecticut.

ANTECEDENT RAINFALL

The effects of the June 4-7 rainfall were compounded in many locations by up to four inches of rain that fell on parts of the State the previous week. This earlier rainfall left soils saturated and many small reservoirs filled to or near capacity (1).

JUNE 4-7 RAINFALL

Light rain began falling in Connecticut around 8:00 pm on Friday evening, June 4. Heavy rain began about midnight and continued all day Saturday and into Sunday morning. Lighter rain continued Sunday afternoon and evening, and light rain and drizzle fell over much of the State through Monday.

Rainfall amounts throughout the State were high. The central, south central and southeastern parts of Connecticut received from eight to 16 inches of rain for the three day period. The southwestern, northwestern and northeastern areas received generally less than eight inches for the same period. Total rainfall ranged from a low of 2.68 inches at Falls Village in Canaan to a high of 16.00 inches at North Lyme in Lyme.

Figure 1.1 presents an isohyetal map showing lines of equal precipitation throughout Connecticut. This map was prepared by the U.S. Geological Survey (USGS) based on rainfall records from 74 sites in Connecticut and an additional 28 sites in New York, Rhode Island and Massachusetts.¹ These sites are listed in Table 1.1.

Daily Precipitation. Although the total rainfall occurred over a period of about 72 hours, the highest single day totals occurred on Saturday, June 5th. Some of the highest 24 hour totals included: Essex (10.65 inches), Southington (9.40 inches), Woodbridge (9.12 inches) and East Haven (9.01 inches) (2). The 24 hour precipitation for a return period of 100 years is between 7 and 8 inches and the 48 hour precipitation for the same return period is between 9 and 10 inches (3), indicating that the June 5th rainfall greatly exceeded a 100-year storm event in many parts of the State.

TABLE 1.1: PRECIPITATION STATIONS SHOWN ON FIGURE 1.1

STATION	LOCATION	INCHES	STATION	LOCATION	INCHES		
CONNECTICUT							
1	Barkhamsted	Barkhamsted	6.55	38	Shuttle Meadow	New Britain	8.80
2	Brooklyn	Brooklyn	7.16	39	McDonough	New Hartford	6.25
3	Nepaug Reservoir	Burlington	8.30	40	Bulls Ridge	New Milford	3.90
4	Falls Village	Canaan	2.68	41	Rocky River Dam	New Milford	7.50
5	NRC 15	Canaan	4.0	42	Norfolk 2W	Norfolk	3.80
6	NRC 4	Chaplin	7.23	43	Lake Gaillard	North Branford	10.55
7	NRC 8	Cheshire	12.04	44	Norwalk Gas Plant	Norwalk	4.00
8	South Cheshire	Cheshire	13.00	45	Norwich Public Utilities	Norwich	7.80
9	NRC 11	Clinton	12.25	46	Lake Wepawaug	Orange	12.00
10	NRC 12	Colchester	8.80	47	Trap Falls	Shelton	9.70
11	NRC 3	Coventry	6.63	48	NRC 23	Simsbury	8.10
12	Danbury	Danbury	5.78	49	Southbury	Southbury	6.60
13	Lake Saltonstall	East Haven	11.85	50	Southington	Southington	10.35
14	Easton Lake	Easton	8.13	51	NRC 24	Stafford	6.10
15	NRC 10	Essex	14.40*	52	Stafford Springs 2	Stafford	5.40
16	Hemlock Reservoir	Fairfield	7.44	53	Bridgeport WSO AP	Stratford	5.70
17	Putnam Lake	Greenwich	3.03	54	West Thompson Dam	Thompson	4.98
18	Groton	Groton	8.90	55	Torrington	Torrington	4.85
19	Lake Menuckatuck	Guilford	8.98	56	NRC 1	Vernon	5.40
20	Cockaponset Ranger Station	Haddam	13.26	57	Wallingford	Wallingford	10.60
21	Lake Whitney	Hamden	11.82	58	Waterbury 1	Waterbury	7.15
22	Mt. Carmel	Hamden	11.60	59	Lake Konomoc	Waterford	11.50
23	NRC 5	Hampton	8.10	60	Saugatuck	Weston	5.80
24	Hartford, Brainard Field	Hartford	5.90	61	Hartford WSO AP	Windsor Locks	7.50
25	NRC 7	Hartford	7.60	62	NRC 2	Winchester	5.35
26	West Branch	Hartland	5.20	63	NRC 6	Windham	6.60
27	Jewett City	Jewett City	5.10	64	Lake Dawson	Woodbridge	12.25
28	Jewett City 3 ESE	Jewett City	5.80	65	Bloomfield	Bloomfield	8.11
29	Shepaug Dam	Litchfield	6.30	66	Hartford Resvr 6	Bloomfield	10.60
30	Lake Hammonasset	Madison	8.80	67	New Haven	New Haven	10.10
31	Mansfield Hollow Dam	Mansfield	6.30	68	Thomaston Dam	Thomaston	6.30
32	Storrs	Mansfield	7.30	69	Al Jeter	Lyme	12.00
33	NRC 9	Meriden	8.10	70	Gene Bibbiani	Chester	15.00
34	Middletown 4W	Middletown	8.30	71	Gary Reynolds	North Lyme	16.00
35	Milford	Milford	7.55	72	NRC 16	West Granby	8.14
36	Stevenson Dam	Monroe	10.0	73	Reservoir 6	West Hartford	9.74
37	Wigwam	Morris	5.50	74	Round Pond	Ridgefield	4.11
NEW YORK							
75	NWS 1	Millbrook	3.35	80	NWS 5	Westbury, L.I.	1.92
76	NWS 2	Glenham	2.73	81	NWS 6	Setaukey, L.I.	5.48
77	NWS 3	Yorktown Heights	2.30	82	NWS 7	Patchogue, L.I.	7.60
78	NWS 4	Pleasantville	1.50	83	NWS 8	Bridgehampton, L.I.	10.78
79	Airport	White Plains	2.04	84	NWS 9	Greenport, L. I.	12.30
MASSACHUSETTS							
85	Airport	Great Barrington	2.46	92	NWS 15	Springfield	6.40
86	NWS 10	Stockbridge	2.80	93	NWS 16	Amherst	3.53
87	NWS 11	West Otis	3.15	94	NWS 17	Ware	4.72
88	NWS 12	Chesterfield	5.41	95	NWS 18	Southbridge	6.09
89	Knightville Dam	Knightville	6.30	96	Airport	Worcester	4.74
90	NWS 13	Westfield	8.90	97	Buffumville Lake	Buffumville	4.73
91	NWS 13	Holyoke	6.46				
RHODE ISLAND							
98	NWS 19	Woonsocket	6.25	101	NWS 21	Kingston	9.39
99	NWS 20	North Foster	7.00	102	Airport	Block Island	4.94
100	Airport	Providence	4.16				

* Not shown on Figure 1.1

Source: U.S. Geological Survey, Hartford, CT. (Data from CT Department of Environmental Protection, Natural Resources Center, and Dept. of Commerce, NOAA, National Weather Service)

Daily precipitation totals for the 36 official National Climatic Center rainfall stations are shown in Table 1.2. The daily readings from these stations are not completely comparable because of the varying times at which the gages are read and rainfall amounts reported to the National Weather Service

offices by observers. The rainfall listed for each date is for the 24 hour period preceding the observation time.

Hourly Precipitation. Hourly rainfall totals for the 12 recording precipitation gages that are part of the official National Weather Service, National Climatic

TABLE 1.2: DAILY PRECIPITATION TOTALS FOR STORM OF JUNE 4-7, 1982

DAILY PRECIPITATION (INCHES)						
OBSERVATION TIME ¹	STATION	4	5	6	7	TOTAL 4-7
<u>Northwest</u>						
8 am	1 Barkhamsted	Trace	.40	5.37	.78	6.55
7 am	40 Bulls Bridge Dam	.07		2.46	1.35	3.88
7 am	4 Falls Village	.01	.02	2.12	.53	2.68
8 am	42 Norfolk 2 SW	.04	Trace	3.21	.53	3.78
7 am	41 Rocky River Dam	.40	.02	5.66	1.38	7.44
noon	Shepaug Dam	.10	.60	3.85	.85	5.40
8 am	55 Torrington			4.10	.75	4.85
noon	37 Wigwam Reservoir	.07	1.90	3.13	.73	5.83
7 pm	Woodbury	Trace	5.30	.85	.44	6.59
<u>Central</u>						
8 am	Ansonia NE	.04	1.32	9.35	1.15	11.84
6 pm	2 Brooklyn		5.91	.25		6.16
8 am	3 Burlington		.81	6.13	1.36	8.30
8 am	20 Cockaponset Ranger Stn		2.05	10.47	.74	13.26
8 am	11 Coventry	-	-	-	-	-
7 pm	12 Danbury	.05	3.78	1.61	.39	5.83
8 am	24 Hartford-Brainard Fld	Trace	1.50	3.50	.91	5.91
midnight	62 Hartford WSO AP	.03	5.88	1.55	.04	7.50
8 am	31 Mansfield Hollow Lake	.03	2.70	3.25	.30	6.28
noon	34 Middletown 4 W	.06	3.15	4.26	.89	8.36
4 pm	22 Mount Carmel	-	-	-	-	-
midnight	45 Norwich Pub Util Plt	.46	6.11	1.26	Trace	7.83
8 am	74 Round Pond	.12	.89	2.51	.59	4.11
5 pm	60 Saugatuck Reservoir		3.01	2.04	.32	5.37
8 am	38 Shuttle Meadow Resvr	.11			8.56	8.67
8 am	52 Stafford Springs 2	.01	2.30	3.22	.39	5.92
7 am	36 Stevenson Dam		.73	7.94	1.32	9.99
8 am	32 Storrs	.06	2.87	4.07	.29	7.29
8 am	73 West Hartford	Trace	1.41	6.82	1.51	9.74
8 am	54 West Thompson Lake	.02	2.35	2.14	.49	5.00
<u>Coastal</u>						
midnight	53 Bridgeport WSO AP	.48	4.79	.83	.05	6.15
8 am	13 East Haven Saltonstall		1.66	9.01	1.17	11.84
midnight	18 Groton	.60	6.30	2.00	.04	8.94
4 pm	67 New Haven		7.00	3.00		10.00
8 am	44 Norwalk Gas Plant		3.00	1.05		4.05
8 am	17 Putnam Lake	Trace	.10	1.93	1.00	3.03
5 pm	Stamford 5 N	Trace	1.32	1.41	.22	2.95

¹ Totals for each day are given for the 24 hour period prior to the observation time.

Source: Climatological Data for New England. Volume 94, No. 6, June 1982. NOAA, National Climate Center, Asheville, N.C., and Bruce Whyte, NWS, NERFC, Bloomfield, CT.

Center hourly precipitation network are shown in Table 1.3. Except for the Cockaponset Ranger Station in Haddam, these recording precipitation gages are all located outside the area of greatest rainfall. The highest rainfall recorded in one hour was at the Cockaponset Ranger Station, which measured 1.4 inches/hour between 9 and 10 pm Saturday. Although the times of heaviest rainfall varied across the State, the recording stations indicated that rainfall in excess of .2 inches/hour generally occurred between 11 pm Friday and 1 am Sunday.

GROUNDWATER LEVELS

Prior to the June 4-7 storm, ground water levels were in the normal to low range. After the storm all measurements were in the high range, as shown in Table 1.4.

TABLE 1.4: GROUND-WATER MEASUREMENTS IN SELECTED OBSERVATION WELLS IN CONNECTICUT BEFORE AND AFTER STORM OF JUNE 4-7, 1982

Location of observation well	Water level in ft below land surface	Date of measurement	Latest pre-storm water-level measurement	Date of pre-storm measurement	Change	Precipitation (in)	Period of record (yrs)	Remarks
Fairfield	6.43	6/14	8.21	5/25	+ 1.78	7	16	Highest June of record 2nd highest of record
Groton	7.35	6/07	14.94	5/26	+ 7.59	9	25	Highest of record
Madison	12.56	6/14	16.37	5/26	+ 3.81	12	1	do
North Haven	11.77	6/14	15.26	5/26	+ 3.49	11	7	do
North Haven	41.31	6/14	53.66	5/25	+12.35	11	7	Highest June of record
North Canaan	9.08	6/09	9.48	6/02	+ 0.40	4	25	
Newtown	1.27	6/14	5.17	5/25	+ 3.90	7	16	Highest June of record 2nd highest of record
Southington	19.18	6/14	21.18	5/25	+ 2.00	10	7	2nd highest of record
Salem	6.18	6/14	9.74	5/25	+ 3.56	11	3	Highest of record
Stonington	1.70	6/06	7.60	5/29	+ 5.90	7	7	do
Torrington	4.76	6/07	6.47	5/31	+ 1.71	5	23	do (Bedrock well)
Woodbury	20.14	6/14	22.57	5/25	+ 2.43	6	33	Highest June of record

Source: Water Resources Conditions in Connecticut, June 1982, USGS, Hartford, CT.

TABLE 1.3: HOURLY PRECIPITATION, STORM OF JUNE 4-7, 1982

HOURLY PRECIPITATION																										
STATION	DATE	A. M. HOUR ENDING												P. M. HOUR ENDING												TOTAL
		1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	
Bridgeport WSO AP 53	4																.04	.01	.01	.01		.04	.27	.10	.48	
	5	.05		.03	.05	.06	.50	.30	.33	.33	.26	.26	.34	.38	.43	.37	.12	.15	.20	.30	.15	.08	.02		4.79	
	6											.11	.23	.04	.05	.10	.16	.03		.02	.04	.04	.01		.83	
	7			.03	.02																				.05	
Cockaponset Ranger Station 20	4																				.1		.1	.3	.5	
	5	.3	.1	.4	.5	.1	.3	.2	.1	.1	.2	.3	.2	.2	.3	.2	.2	.2	.3	.4	.5	.7	1.4	.8	8.4	
	6	.2	.1				.1				.1		.2	.1	.1	.2									1.1	
	7												.1												.1	
Hartford Reservoir 6 66	5	.4			.1	.2	.3	.2	.3	.2	.4	.4	.4	.5	.8	.5	.4	.2	.5	.4	.5	.6	.4	.2	.2	8.1
	6	.1	.1	.1	.2	.1		.1			.2	.1	.1	.2		.3	.2	.1	.1						2.0	
Hartford Brainard Fld 24	4																.02	.04						.24	.30	
	5	.22	.18	.16	.16	.13	.13	.21	.10	.12	.25	.11	.11	.14	.17	.16	.09	.08	.15	.19	.20	.39	.43	.06	.10	4.04
	6	.05	.06	.03	.02	.03	.02	.03	.03	.02	.04	.09	.09	.09	.09	.09	.08	.09	.05							1.00
	7							.01																	.01	
Hartford WSO AP 62	4																	.02						.01	.03	
	5	.17	.23	.03	.02	.04	.14	.27	.27	.19	.23	.35	.50	.40	.27	.31	.25	.07	.15	.20	.30	.40	.53	.34	.22	5.88
	6	.07	.28	.18	.10	.12	.06	.05	.05	.06	.03	.05	.07	.04	.09	.10	.03					.01	.07	.04		1.55
	7	.01					.01	.01									.01									.04
Jewett City 27	4																						.1	.3	.4	.8
	5	.2	.2	.4	.3	.3		.1	.1	.1		.1	.1	.2	.2	.2		.1	.1	.2	.3	.3	.2	.1	3.8	
	6	.2	.1		.1	.1		.1	.1					.1	.1	.2	.2		.1	.1	.2	.3	.3	.2	.1	.7
	7									.1																.1
Mansfield Hollow Lake 31	4																					.03	.06	.07	.24	.40
	5	.41	.38	.28	.45	.47	.25	.10	.10	.09	.09	.08	.07	.08	.14	.21	.17	.14	.09	.10	.13	.30	.33	.31	.25	5.02
	6	.20	.06	.06	.05	.05	.12	.03	.02		.01	.02	.03	.01		.01										.67
Norfolk 2 SW 42	5					.05	.21	.15	.17	.20	.31	.23	.20	.20	.20	.20	.15	.13	.13	.18	.10	.05	.05	.02	.2	2.93
	6	.02	.02	.01	.01	.01	.03	.02	.02	.02	.02	.02	.02	.02	.06	.05	.05	.05	.02	.01	.02	.02	.02	.02	.02	.58
	7			.01			.03	.02	.02	.02	.01			.01	.01	.01	.01	.01								.16
Rockville	5	.1	.3	.3	.5	.3	.1	.1	.1	.1	.1	.1	.1	.2	.2	.1	.1	.1	.1	.1	.1	.3	.3	.5	.6	4.8
	6	.2	.1	.1	.1	.1	.1					.1	.1	.1	.2	.1										1.3
	7							.1																		.1
Stafford Springs 2 52	5	.1	.3	.9	.5	.4	.1	.1		.2	.1		.1	.1	.1	.1	.1	.1		.2		.1	.3	.3	.7	4.9
	6	.2	.1	.2		.1	.1	.2		.1	.2															1.2
	7			.1																						.1
Thomaston Dam 68	5				.1		.1	.4	.2	.3		.5	.4	.2	.3	.5	.4	.3	.2	.4	.4	.4	.1			5.5
	6	.1									.1			.1				.1	.1		.1				.1	.7
West Thompson Lake 54	4																						.1	.2	.3	.3
	5	.5	.3	.2	.4	.4	.1	.1	.1		.1				.1		.1					.1	.3	.3	.3	3.4
	6	.4	.1	.1							.1		.1			.1										.9
	7	.1				.1																				.2

Source: Hourly Precipitation Data, Vol 32, No. 6, June 1982, Dept of Commerce, NOAA, National Climatic Center, Asheville, NC.

FLOODING

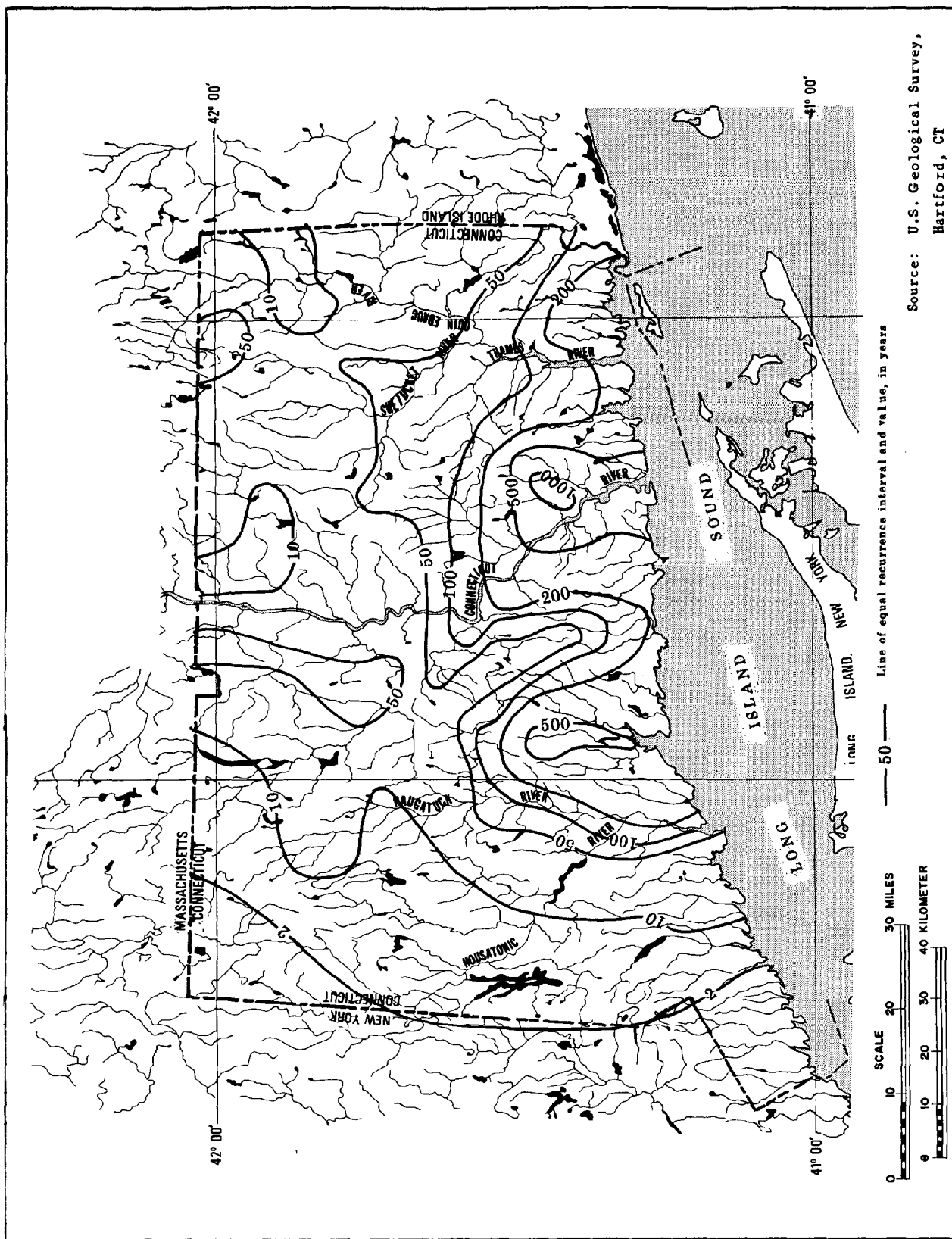
The heavy rainfall caused floods and flashfloods on innumerable small streams and rivers throughout most of Connecticut. Record flooding was recorded for many small streams in the central and south central parts of the State. Figure 1.2² shows the resulting recurrence intervals of peak flows across the State.

The area east of the Housatonic River (about 70 percent of the State) experienced floods equal to or greater than the 10-year recurrence interval. South central to southeast Connecticut (about 25 percent of the State) experienced floods equal to or exceeding the 100-year recurrence interval. Numerous small streams in the south central area had flooding greater than a 200- or even 500-year recurrence interval.



Moodus River flooding Falls Road just below the Moodus Reservoir in East Haddam. (Photo by Bill Plyler)

FIGURE 1.2: RECURRENCE INTERVALS OF PEAK FLOWS OF STREAMS IN
CONNECTICUT FOR THE STORM OF JUNE 4-7, 1982



**TABLE 1.5: MEASUREMENTS OF PEAK FLOW OF STREAMS IN CONNECTICUT
FOR STORM OF JUNE 4-7, 1982**

Stream and Location	USGS Station Number	Bridge Number	Upstream elevation (in feet above NGVD of 1929)	Discharge (ft ³ /s)	Drainage area (mi ²)	Unit runoff (ft ³ /s/mi ²)	Recurrence interval (years)	Discharge for 100- and 500-year recurrence intervals		Remarks
								Q100	Q500	
Clark Creek at Haddam	-	-	83.3	1710	2.59	660	500	1100	1700	Measured at Rt 82 culvert, connector Rt 9 to Rt 9A.
Coginchaug River at Middlefield	01192883	-	146.4	2110	29.5	-	50	-	-	Measured by current meter.
Deep River at Deep River	-	00620 (Rt 9A)	46.4	1300	5.82	223	300	1050	1540	Measured at Rt 80.
Deep River at Deep River	-	-	42.7	1420	6.71	212	300	1100	1600	Measured at Bridge St.
E. Branch Eightmile River near N. Lyme	01194500	-	64.4	5170	22.3	-	1000	-	-	-
Eightmile River at North Plains	01194200	-	68.9	5200	20.1	-	1000	-	-	Elevation at USGS gaging station 01194100 = 57.8 ft above NGVD. Measured at 01194100 (Rt 156).
Falls River at Essex	-	-	38.0	13400	13.5	-	>1000	-	-	Measured at Rt 9.
Fourmile River at East Lyme	01127800	03321 (Rt 51)	a/ 9.24	1280	3.48	368	400	830	1350	a/ Gage height; at Rt 51 flow = 368 x 5.16 = 1900 ft ³ /s. Q500 = 2000 ft ³ /s, Q100 = 1230 ft ³ /s.
Freshwater Brook at Enfield	01183994	-	105.0	575	10.8	-	10	-	-	Measured at dam downstream.
Harbor Brook at Meriden	01196250	-	b/ 174.1	743	8.32	-	30	-	-	b/ Elevation at downstream side of bridge.
Indian River at Clinton	-	-	23.9	2750	6.60	-	1000	-	-	Measured at Glenwood Road.
Indian River near Clinton	01195100	-	b/ 43.1	2600	5.64	-	1000	-	-	b/ Elevation at downstream side of bridge.
Latimers Brook near East Lyme	-	00367 (Rt 1)	42.4	2990	18.5	162	200	2500	3760	Measured at Rt 95.
Latimers Brook near Montville	-	01402 (Rt 161)	115.9	2210	12.6	175	200	2000	3300	Measured at Silver Falls.
Menunketesuck River near Clinton	01195000	02673 (Rt 145)	39.1	3210	11.2	289	350	2120	3800	Measured at Cobbs Bridge Road upstream from USGS gaging station 01195000; Drainage area = 15.1 mi ² at Rt 145, flow = 4000 ft ³ /s, Q100 = 3000 ft ³ /s.
Menunketesuck River at Killingworth	-	01134 (Rt 80)	170.0	3420	9.79	349	350	2700	4500	Measured at Kelseytown Reservoir; drainage area = 6.28 mi ² at Rt 80.
Mill River at Hamden	01196620	-	92.1	5580	24.5	-	500	-	-	Measured at Clark Pond 0.5 miles downstream.
Mill River near Hamden	01196826	-	40.2	6750	36.4	-	500	-	-	Measured at Lake Whitney.
Neck River near Madison	01195200	-	16.7	1040	6.55	-	200	-	-	-
Pattoconk Brook near Chester	-	02691 (Rt 148)	153.6	1560	6.93	225	500	1000	1600	Measured at Rt 148, 2nd bridge upstream of Rt 9, bridge 01374.
Pattoconk Brook near Chester	-	02694 (Rt 148)	133.1	1700	7.63	223	500	1100	1700	Measured at exit 6, northbound off ramp from Rt 9.
Ponset Brook at Higganum	-	01337 (Rt 81)	98.0	2020	6.73	300	300	1450	2470	Measured at Higganum Reservoir.
Quinnipiac River at Wallingford	01196500	-	33.3	8200	110	-	350	-	-	Measured by current meter.
Roaring Brook near Lyme	-	02508 (Rt 82)	45.7	5300	7.22	644	>1000	1340	2000	Measured at 1800 ft upstream from Rt 82 at Hadlyme; dam failed upstream, Q100 = 1350 ft ³ /s, Q500 = 2000 ft ³ /s.
Salmon River near East Hampton	01193500	-	b/ 78.1	18500	102	-	200	-	-	b/ Elevation at downstream side of bridge, measured at Rt 16.
Waterhouse Brook near Chester	-	02696 (Rt 148)	47.6	440	1.22	361	300	332	484	Measured at Rt 9A.
Wepawaug River near Milford	01196700	-	43.5	5020	18.4	273	400	3540	5400	Measured at Rt 95 upstream from USGS gaging station 01196700.
Wepawaug River near Orange	-	01327 (Rt 121)	91.0	4370	12.7	326	400	2800	4660	Measured at Old Grassy Hill Road.
Willow Brook at New Britain	01192692	-	109.4	1100	6.65	-	50	-	-	-
Yantic River at Yantic	01127500	-	109.3	9,800	90.0	-	150	-	-	Measured at Confall bridge.

Source: Water Resources Data, Connecticut, Water Year 1982. U.S. Geological Survey Water-Data Report CT-82-1; Corrections provided by L.A. Weiss, USGS, Hartford, CT.

Despite the record flooding, there was very little accurate delineation of flooded areas or high water marks. State and Federal agencies collected information on flood levels in some of the river basins they were studying (see Chapter 5), but interviews with municipalities indicated almost no mapping of flooded areas.

SMALL STREAM FLOODING

Small streams caused the most flooding. Outside the area of heaviest rainfall, flooding from these small streams was similar in location and magnitude to the larger floods that had occurred since 1955. However, in the south central portion of the State where more than eight inches of rain fell, flooding from the small streams was frequently of record proportions. In these watersheds, normally flood prone areas were flooded to a greater depth than previously experienced, and areas with no previous record of floods were also flooded.

Some of the streams with the most severe flooding were Eightmile River and Roaring Brook in Haddam and Lyme; Clark Creek in Haddam; Indian River in Clinton; Wepawaug River in Orange and Milford; Mill River in Hamden; Pataconk Brook in Chester; Fourmile River in East Lyme; and Falls River in Essex. The flooding of the Falls River was made much more severe by the collapse of the Bushy Hill Reservoir in the upper reaches of the watershed, which contributed to the subsequent collapse of several more small dams downstream.

Measurements at Bridgeport during the period of flooding showed both high and low tides 1.5 to 2 feet above normal.

This small storm surge may have contributed to the severity of flooding at coastal locations by slowing discharge from streams (1). The storm surge itself did not cause coastal flooding, and, except where rivers discharged to Long Island Sound, shoreline areas were generally not affected by this storm.

Table 1.5 and Appendix B provide peak flow data for several streams based on measurements by the U. S. Geological Survey (USGS). The peak flows and frequency data shown in Table 1.5 were collected by USGS at the request of the Connecticut Department of Transportation (DOT) at locations near State bridges that were destroyed. Direct and indirect measurements of peak discharge were made at ungaged locations near these bridges to supplement the data from existing USGS stream gage stations. Appendix B presents data from stream gages maintained by the USGS.

In addition to overbank flooding of streams, substantial flooding also resulted from inadequate or blocked drainage systems in many urban areas and along roadways. Drainages alongside roadways and culverts across roads were often inadequate to handle heavy runoff resulting from the intense rainfall. Debris, especially branches and uprooted trees, blocked many small bridges causing streams to pond and overflow, sometimes cutting new channels around the bridges and across roads. Excessive runoff from the intense rainfall also generated rivulets that created gullies and minor mud slides, particularly in locations with steep topography. Basement flooding due to high water tables and saturated soil conditions was widespread.

MAJOR RIVER FLOODING

Very little flooding occurred along Connecticut's major rivers, and they were not the source of much damage. Flood peaks recorded by the Northeast River Forecast Center (NERFC) at its streamlevel gages on the major Connecticut rivers for which it issues specific flood forecasts are given below in Table 1.6.

**TABLE 1.6: FLOOD STAGES FOR MAJOR, MAIN STEM RIVERS RECORDED BY
THE NORTHEAST RIVER FORECAST CENTER**

STATION	PEAK	TIME	FLOOD STAGE
Farmington River at Simsbury	16.3 ft	1 am & 7 am 6/7	12 ft
Connecticut River at Hartford	20.1 ft	1 pm 6/7	16 ft
Connecticut River at Middletown	11.2 ft	7 pm 6/7	8 ft
Housatonic River at New Milford	7.7 ft	1 am 6/7	8 ft
Housatonic River at Stevenson	14.5 ft	7 am 6/6	12 ft
Housatonic River at Beacon Falls	12.2 ft	7 pm 6/5	12 ft
Shetucket River at Willimantic	14.5 ft	1 pm 6/6	13 ft

Source: National Weather Service, Northeast River Forecast Center, Bloomfield, CT

CHAPTER 2

EMERGENCY ACTIONS

Flood emergency declared

By JULIE EAGLE
Telegram staff writer

Gov. William A. O'Neill declared a state of emergency early today as Connecticut struggled through a weekend of devastating rains.

He announced that he would seek federal assistance to help the flood-ravaged state recover losses from property damage.

At least four Southwestern Connecticut residents were reported missing or dead from the killer storm, which drenched the area with two more inches of Sunday.

"We're going to be doing everything we can for everybody," O'Neill said earlier Sunday as he toured the flooded and damaged areas.

DeNardis said in a telephone interview that he made a pitch Sunday night to Edward Meese, counselor to President Ronald Reagan, for aid to recover extensive property damage in the hard-hit areas.

DeNardis joined O'Neill and officials from the Federal Emergency Management Agency in Boston in the tour of the rain-damaged areas Sunday.

"I just spent the last 12 hours assessing the situation and I felt the obligation

National Weather Service recorded a rainfall total as high as 9.73 inches in some areas.

Under the emergency

FEMA officials agree assessment — Presi asked to declare the tied to "a broad rescue program," but local governments,

homeowners, DeNardis estimated, the district, the it

Stratford to Clinton

She declared a state of emergency Saturday night, barring downtown Mil-

were badly flooded. The storm dumped up to 16 feet of water into the

Deep River Firefighters Risk Lives to Save Three

By LUCY GUSTAFSON

DEEP RIVER — Two men and a woman were rescued at the height of the disastrous rain storm about mid night last Saturday by two Deep River firefighters who risked their lives and plunged into the roaring Deep River at the Elm Street bridge.

Fire Chief Peter Woodcock, in disclosing the details of the rescue, praised the quick thinking and courage of Harry Stihes and Andrew Olson, both

had to be abandoned, it was not possible for the firemen on the east side of the river to reach the car and its occupants in time, and the boat arrived too late to be of assistance. The car was later towed from under the water by Bartlett's Garage here.

Deep River firemen were called out about 5:20 p.m. Thursday when a furnace backed up at the Cameron home on Lords Lane here. Murray Zack, spokesman for the fire department, explained that the furnace malfunctioned due to

ing of the basement of the There's was lots of smoke but image," Zack reported.

n were called out on a similar

Salmon River Overflows; Five Families Evacuated

EAST HAMPTON — Five families were evacuated from Bridge Street Saturday night when the Salmon River

Non-Com Cited
Staff Sgt. Deborah L. Ogle, daughter of Barbara J. and Robert E. Wakefield — 40 Westview St. has been named out-

Search continues for missing

By JOANNE M. PELTON
Telegram staff writer

It looks like the worst is over — as cleanup crews and pumps today try to soak up nearly 10 inches of water that fell in Connecticut during the last three days.

Three persons are still missing and are presumed drowned after being dragged under fast moving water that swelled and

another man were riding in was swamped by water Saturday. A land search on Monday was called off and state police will conduct another search today.

A Westport teen-ager was rescued by a friend on Sunday after she was swept into a stream called "Dead Man's Creek" in Westport, pulling her through a 150-foot long underground tunnel.

"I thought I was going to die," she

DEP's four-day flood watch at Beach Pond finally ends

VOLUNTOWN — The four-day, around-the-clock flood watch at Beach Pond ended early Wednesday morning after the high water levels of the weekend dropped by almost 18 inches.

However, the earthen dam may receive more attention later this year from state Department of Environmental Protection

State Offers Some Health Tips for Flood Victims

HARTFORD, Conn. (UPI) — Connecticut homeowners living in flooded areas were urged by state health officials Sunday to boil their drinking water contaminated and to toss out any food damaged by flood.

The Department of Health Services cautioned residents to be careful of leaks from extinguished pilot lights from short circuits in electrical appliances.

The agency issued the following guidelines:

Wells and Septic Tank Systems
Flooded wells should be checked for contamination. If debris or silt has entered the well, the well should be pumped until it clears. Disinfect the well with two cups household bleach per gallon of water and flush it over the well casing. Turn on all pumps until you can smell a strong

hours or longer and then flush it from the system. Boil one quart of water or add five drops of bleach and allow it to stand for 30 minutes before drinking. Drinking polluted water can cause hepatitis, dysentery and diarrhea.

House and Household Effects

Drain or pump out flooded ceilings and base down with clean water then wash the area down with a solution of one cup of bleach in 16 gallons of water. Wash flood-damaged toys in hot soapy water and disinfect in solution of clean water and household bleach. Throw out stuffed toys damaged by water.

Wash curtains, clothing and bedding in hot, soapy water and bleach whenever possible. Rugs can be flushed with clean water, shampooed and air dried. Rinse furniture with clean water, disinfect with bleach if possible.

packaged in bags or boxes. It is advisable not to use food in containers and sealed with screw tops, corks, home canned or rubber-ring-sealed jars if they are submerged in flood waters. Because of the type of lid, it is very difficult to properly sanitize this type of container and food could be contaminated as it is removed from the container. Commercial canned goods may be used if the outside of the container is washed with a detergent solution and then disinfected with boiling water or a chlorine solution.

Other Flood Hazards

If your home has been flooded, pilot gas lights may have been extinguished and gas could have accumulated in the basement. Flooding may also cause short circuiting of electrical appliances such as hot-water circulation systems.

should not put their hands to their mouth or handle food until their hands have been washed with soap and clean water.

Power Outages

Unplug your appliances. Sometimes power returns at low or fluctuating levels. Having your appliances on the line may harm your appliances as power is restored. Never tie an emergency generator into the power system unless a complete separation exists between the utility supply and your generator. Unless a separation exists, power which you are not using goes out to the lines and may cause injury to a utility employee or a neighbor.

Use heat and light with caution. Use care with candles or any open flame. Don't use charcoal grills indoors for heating or cooking and don't use gas

properly vented to the outdoors.

Conserve water even public water supply. A may severely affect the available water.

When refrigerator or freezer gets above 45 degrees should be discarded. Keep refrigerator and freezer doors closed or refrigerators to keep the cold in. Don't re-freeze thawed frozen food if it has been thawed in quality. Roasts may be refrozen if they are fully frozen. You can ground beef if the temperature is less than 45 degrees, but don't refreeze.

Be especially careful with egg products, milk and

The record rainfall and flooding that occurred over the weekend of June 5-6 resulted in the mobilization of Federal, State and local resources for emergency actions. Although warnings of potential flooding were issued by the National Weather Service (NWS) offices, neither the NWS nor State and local officials were fully aware of the extent and severity of flooding that was to occur. Consequently, much of the emergency action taken by State and local governments was in response to flooding as it happened, rather than in anticipation of flooding.

FLOOD WARNINGS

NATIONAL WEATHER SERVICE

The National Weather Service is the primary source of information about excessive rainfall and flood potential. Several NWS offices are normally involved in providing weather forecasts and flood warnings for Connecticut. The Weather Service Forecast Office (WSFO) in Boston has primary weather forecasting responsibility for Connecticut, as well as Massachusetts and Rhode Island.

Locally, the Weather Service Office (WSO) in Hartford has responsibility for providing warnings to the four northern Connecticut counties of Litchfield, Hartford, Tolland, and Windsor, as well as New London County in southern Connecticut. The Bridgeport WSO has warning responsibility for Fairfield, Middlesex, and New Haven Counties in southern Connecticut. The Bridgeport WSO is a part-time office which normally operates between 6 am and 10 pm. When the Bridgeport WSO is closed, the Hartford WSO assumes

warning responsibility for the entire State. The Northeast River Forecast Center (NERFC) in Bloomfield is responsible for providing flood forecasts for major rivers in Connecticut as well as Massachusetts and Rhode Island.

Initial forecasts of the June 4-7 storm were made by the Boston WSFO Friday morning, June 4, indicating the possibility of rain throughout the area, heavy at times. By Friday afternoon the forecast called for heavy rain beginning Saturday afternoon and continuing into Saturday night. The Boston WSFO alerted NERFC in Bloomfield of the heavy rain forecast, and NERFC prepared a "Flood Potential Outlook" statement just before 3:00 pm Friday (Figure 2.1). NERFC notified local television stations and the flash flood coordinators in Norwich and Hartford of the possibility of heavy weekend rains.

The storm moved into the area sooner than forecast by the Boston WSFO, and heavy rain began late Friday and early Saturday. At 3:55 am Saturday the Boston WSFO issued an "Urban Small River and Stream Flood Advisory" for its entire forecast area.

During the early morning hours of Saturday, the Hartford WSO received reports from eastern and southern Connecticut of heavy rain but no flooding. Around 5:00 am the Hartford WSO received a report from Norwich that the Yantic River in New London County was rising rapidly but no flooding had yet occurred. The Hartford WSO advised the NERFC hydrologist on call³ of the Yantic River situation, and NERFC issued a "Flood Warning" for the Yantic River near Norwich at 5:55 am (Figure 2.2). At 6:00 am the Hartford WSO issued a "Special Weather Statement" advising of a flood warning for the Yantic River in eastern Con-

**FIGURE 2.1: NORTHEAST RIVER FORECAST CENTER
"FLOOD POTENTIAL OUTLOOK",
FRIDAY, JUNE 4, 2:51 PM**

BOSESFHF
WOUS00 KHFD 041900
FLOOD POTENTIAL OUTLOOK
NATIONAL WEATHER SERVICE HARTFORD, CT
02:51 PM EDT JUN 04 1982

...MORE RAIN THIS WEEKEND.....

AS YOU ARE WELL AWARE... THIS PAST WEEK HAS BEEN A VERY WET ONE FOR THE THREE SOUTHERN NEW ENGLAND STATES. RAINFALL FOR THE WEEK VARIED A GREAT DEAL THROUGHOUT THE AREA. CENTRAL CONNECTICUT AND SECTIONS OF CENTRAL AND EASTERN MASSACHUSETTS RECEIVED BETWEEN 4 AND 5 INCHES OF RAIN. RHODE ISLAND AVERAGED 3 1/2 INCHES FOR THE WEEK. MANY OTHER SECTIONS RECEIVED BETWEEN 2 AND 4 INCHES FOR THE PERIOD.

LOCALIZED FLOODING OCCURRED IN SOME SECTIONS EARLY WEDNESDAY WHEN THE MOST INTENSE RAINFALL OCCURRED. WORCESTER MASSACHUSETTS RECEIVED 3.17 INCHES OF RAIN IN ONE SIX HOUR PERIOD.

AS A RESULT OF THIS RAINFALL... THE GROUND IN SOUTHERN NEW ENGLAND IS QUITE WET. MORE RAIN IS EXPECTED OVER THE WEEKEND. SOME SHOWERS ARE NOW OCCURRING BUT THE STEADY AND HEAVIER RAIN IS NOT EXPECTED UNTIL SATURDAY. IT IS STILL TOO EARLY TO SAY HOW MUCH RAIN WILL FALL BUT HEAVY RAIN IS A POSSIBILITY FOR LATE SATURDAY OR EARLY SUNDAY.

AMOUNTS OF 1 1/2 TO 2 INCHES IN A SHORT PERIOD OF TIME WOULD CAUSE URBAN AND DRAINAGE FLOODING PROBLEMS. AMOUNTS OVER 2 1/4 INCHES IN A 3 TO 6 HOUR PERIOD COULD START SOME SMALL STREAM FLOODING PROBLEMS IN SOME SECTIONS OF SOUTHERN NEW ENGLAND.

ALL INTERESTS ARE URGED TO MONITOR THE LATEST NATIONAL WEATHER SERVICE FORECASTS FOR THE LATEST DEVELOPMENTS ON THIS SITUATION.

ADDITIONAL STATEMENTS WILL BE ISSUED AS NEEDED.

NERFC/CSH

**FIGURE 2.2: FLOOD WARNING FOR THE YANTIC RIVER,
SATURDAY JUNE 5, 5:55 AM**

BOSFLWHD
WOUS00 KHFD 051000
FLOOD WARNING
NATIONAL WEATHER SERVICE HARTFORD, CT
05:55 AM EDT JUN 05 1982

FLOOD WARNING FOR THE YANTIC RIVER IN EASTERN CT.

HEAVY RAINS DURING THE NIGHT IN EASTERN CONNECTICUT HAVE CAUSED THE YANTIC RIVER TO RISE NEAR BANKFULL. NORWICH POLICE REPORT AT 5:30 AM TODAY THAT IT WAS JUST WITHIN ITS BANKS.

RAIN FORECAST FOR THE DAY WILL MAKE THE RIVER RISE MORE SO THOSE LIVING ALONG ITS BANKS SHOULD KEEP A CLOSE WATCH AND BE PREPARED TO EVACUATE. FORECASTS OF CRESTS WILL BE ISSUED LATER AS RAINFALL AND AMOUNT MORE IS ASCERTAINED.

WHYTE NERFC.

BOSFLWHD

necticut and the possibility of flooding in other parts of Connecticut during the next 48 hours (Figure 2.3). At 8:35 am the Boston WSFO updated its forecast to include "Urban small river and stream flood warnings thru Sunday".

At 11:00 am NERFC issued a flood warning for southern New England, including specific stage forecasts for major rivers and quantitative precipitation forecasts (Figure 2.4). Throughout Saturday and Sunday, the Boston WSFO, Hartford WSO, and NERFC continued to issue updated forecasts, flood warnings, and special weather statements. Although there were discussions between NERFC and the

Boston WSFO regarding the issuance of special flash flood warnings, none were issued. The Bridgeport WSO closed as usual at 10:00 pm on Saturday and its responsibilities were taken over by the Hartford WSO until 6 am Sunday. (1,4,5,6).

Data Sources for the National Weather Service. The National Weather Service uses data from several sources to make rainfall and flood forecasts and to determine the actual location and duration of rainfall and flooding. These sources include satellite data, radar, river gages and volunteer observers.

**FIGURE 2.3: SPECIAL WEATHER STATEMENT FOR CONNECTICUT,
SATURDAY, JUNE 5, 9:15 AM**

BOSSPSBDL
WOUS00 KBDL 051500
-BOSSPSBDL
SPECIAL WEATHER STATEMENT FOR CONNECTICUT AND HAMPDEN
COUNTY OF MASSACHUSETTS
NATIONAL WEATHER SERVICE HARTFORD CT
915 AM EDT SAT JUNE 5 1982
...FLOOD WARNING FOR THE YANTIC RIVER IN EASTERN CT. ...URBAN AND
SMALL RIVER/STREAM FLOODING ELSEWHERE EXCEPT FLOOD ADVISORY FOR NW
HILLS OF CONNECTICUT AND BERKSHIRES OF MASSACHUSETTS THROUGH SUNDAY...

HEAVY RAINS HAVE CAUSED THE YANTIC RIVER TO OVERFLOW THIS MORNING. MORE
HEAVY RAIN EXPECTED TO CONTINUE THROUGH SUNDAY CAUSING SOME SMALL RIVERS
AND STREAMS TO OVERFLOW THEIR BANKS IN OTHER PARTS OF CONNECTICUT AND
HAMPDEN COUNTY OF MASSACHUSETTS WITHIN THE NEXT 48 HOURS.

PERSONS LIVING NEAR SMALL RIVERS AND STREAMS SHOULD LISTEN TO THE
LATEST ADVISORIES FROM THE NATIONAL WEATHER SERVICE AS ADDITIONAL
STATEMENTS AND FORECASTS ARE ISSUED THROUGHOUT THE DAY.

GILLETTE
SENT 930 AM

**FIGURE 2.4: FLOOD STAGE FORECASTS FOR MAJOR RIVERS,
SATURDAY, JUNE 5, 11:49 AM**

0805FLWHD
RWUS KHFD 051600
FLOOD WARNING
NATIONAL WEATHER SERVICE HARTFORD, CT
11:49 AM EDT JUN 05 1982

FLOOD WARNING FOR SOUTHERN NEW ENGLAND

NEARLY 4 INCHES OF RAIN HAVE FALLEN IN SOME SECTIONS OF EASTERN CONNECTICUT AND RHODE ISLAND IN THE LAST 24 HOURS. TWO TO THREE INCHES HAVE BEEN REPORTED IN EASTERN MASSACHUSETTS.

SMALL RIVERS AND STREAMS IN EASTERN CONNECTICUT, EASTERN MASSACHUSETTS, AND RHODE ISLAND ARE RISING RAPIDLY.

IN CONNECTICUT THE YANTIC RIVER IS NOW AT FLOOD STAGE AND RISING
IN RHODE ISLAND . . SMALL STREAMS ARE REPORTED TO BE NEAR BANKFULL AND RISING.

IN MASSACHUSETTS .. THE CHARLES RIVER IS NOW NEAR FLOOD STAGE AND RISING.
HEAVY RAINS ARE FORECAST TO CONTINUE THROUGH TONIGHT AND INTO SUNDAY. AN ADDITIONAL TWO TO THREE INCHES OF RAIN ARE POSSIBLE OVER SOUTHERN NEW ENGLAND IN THE NEXT 24 HOURS. MORE RAIN ON OUR ALREADY SATURATED SOILS WILL CAUSE CONTINUED RISES ON ALL STREAMS AND RIVERS.

THE MAJOR RIVERS OF SOUTHERN NEW ENGLAND WILL EXPERIENCE SIGNIFICANT WITHIN BANK RISES BY SUNDAY MORNING.

YOUR NATIONAL WEATHER SERVICE URGES YOU TO BE ALERT TO RAPIDLY CHANGING RIVER AND STREAM CONDITIONS. NATIONAL WEATHER SERVICE ADVISORIES AND FORECASTS WILL BE ISSUED THROUGHOUT THE DAY.

THE FOLLOWING ARE SPECIFIC STAGE FORECASTS BASED ON THE ANTICIPATED RAINFALL FOR THE NEXT 24 HOURS:

CONNECTICUT RIVER
HARTFORD FLOOD STAGE IS 16 FT 7 AM STAGE WAS 6.3 FT
THE RIVER WILL RISE TO A STAGE NEAR 9 1/2 FT BY SUNDAY MORNING.

YANTIC RIVER
NORWICH FLOOD STAGE IS 8 FT
THE RIVER WILL RISE TO 2 TO 3 FEET ABOVE FLOOD STAGE BY SUNDAY AM

CHARLES RIVER
CHARLES RIVER VILLAGE FLOOD STAGE IS 4 FT 7 AM STAGE WAS 3.5 FT
THE RIVER STAGE WILL RISE TO NEAR 6 1/2 FT BY SUNDAY MORNING.

BLACKSTONE RIVER
NORTHBRIDGE FLOOD STAGE IS 9 FT 7 AM STAGE WAS 5.8 FT
THE RIVER WILL RISE TO A STAGE NEAR 10 FEET BY SUNDAY MORNING

WOONSOCKET FLOOD STAGE IS 9 FT 7 AM STAGE WAS 6.4 FT
THE RIVER WILL RISE TO A STAGE NEAR 11 FT BY SUNDAY MORNING.

SHE TUCKET RIVER
WILLIMANTIC FLOOD STAGE IS 13 FT 7 AM STAGE WAS 7.3 FT
THE RIVER WILL RISE TO A STAGE NEAR 12 1/2 FT BY SUNDAY MORNING.

THE NEXT MESSAGE WILL BE ISSUED SATURDAY EVENING.

TODD MENDELL

The major source of information on potential rainfall is the Quantative Precipitation Forecasts (QPF) prepared by the Boston WSFO. While these forecasts indicated an accumulation of several inches of rain throughout New England, they did not forecast the very large amounts of 8 to 16 inches that fell over eastern and southern Connecticut. Satellite data indicated heavy precipitation of .2 to .4 inches/hour for the New England area, but these estimates were below criteria established by NWS for issuance of flash flood warnings.

Radar coverage for Connecticut is provided by NWS stations in New York, Chatham and Hartford. These radar stations were monitored continuously throughout the storm period, but radar data did not indicate cause for immediate concern. Except for the Hartford WSO, radar observations indicated rainfall generally less than .5 inch/hour.

The NWS also uses a network of volunteer observers to determine the actual rainfall and flooding that is occurring in an area. Observers call in reports of precipitation and flooding every six hours (7am, 1pm, 7pm, 1am)⁴. At the time of the June 1982 floods, approximately 20 volunteer observers provided data to NERFC or the Hartford WSO. The Bridgeport WSO did not utilize a network of volunteer observers.

Many of these observers are located at dams (Corps of Engineers operated flood control dams and Northeast Utilities dams along the Housatonic River) and sewage treatment plants where personnel are available 24 hours a day. Other observers are individual volunteers with an avid interest in the weather, and participants in the Norwich Self-Help Program. Monitoring of rainfall and

river levels in the Yantic River basin by volunteers in the Norwich Self-Help program permitted NWS to issue more accurate flood warnings and weather statements for that area.

The Skywarn Amateur Radio Network (used mainly for tornado watches) was also activated on Saturday morning. Nine volunteers operated the system until Sunday night. Their observations on rainfall and flooding were received and evaluated by the Hartford WSO and relayed to NERFC by telephone.

The NERFC also maintains several river gage stations along the Connecticut, Housatonic, Farmington and Shetucket Rivers. Readings from these gages were telemetered to NERFC over telephone lines. In addition, one automated rainfall gage is maintained by NERFC near its office in Bloomfield.

Although several sources of data were used by the weather service offices and NERFC, the amount and extent of excessive precipitation and the seriousness of the flooding along small streams was not known by NWS until after the storm was over. Rainfall forecasts were considerably less than the amount of rain that actually fell, and the network of volunteer observers proved insufficient to indicate the amount of rain that was falling. This deficiency was particularly apparent in the south central area of Connecticut where the heaviest rainfall occurred.

Following an internal review of its activities related to the June 1982 storm and floods, NWS initiated several improvements to strengthen its forecast and warning abilities, including an improved radar system and additional observers in southern Connecticut. NERFC also encouraged the State and

municipalities to develop automated flood warning systems that would provide greater warning time for small streams. (1,4,5,6,7)

Dissemination of Information by the National Weather Service. The NWS used its normal communication methods to disseminate forecasts and warnings. These methods were the NWS teletype, NOAA VHF Weather Radio, and the National Warning System (NAWAS).

In addition to the standard means of communications, NERFC was in direct telephone contact with the civil preparedness director and flood coordinator for the Norwich Self-Help Program and

the Hartford Flood Warning Group. The NERFC also telephoned WFSB-TV (Channel 3) in Hartford and WTNH-TV (Channel 8) in New Haven to confirm that they had received the "Flood Potential Statement" issued on Friday afternoon.

The Bridgeport WSO, until it ceased operations at 10 pm Saturday, was in direct telephone contact with the New Haven Emergency Operations Center. The Bridgeport WSO also provided live broadcasts over New Haven radio station WELI, through a hot-line between the weather service office and the radio station. (1,5,7,)

NERFC OFFICES FLOODED

The Northeast River Forecast Center in Bloomfield experienced its own flooding problems during the June storm. NERFC offices had to shut down for about 14 hours during the period of most severe flooding -- from 11 pm Saturday until 1 pm Sunday.

NERFC offices are located in the basement of a building, and the shutdown was caused by water backflowing through a drain and flooding the basement. The water affected electrical and telephone lines located beneath a raised floor supporting the center's computer equipment. The staff was forced to shut down the equipment and turn off power to avoid damage.

Responding to their own emergency, NERFC staff -- aided by local firemen -- transported a portable terminal, essential manuals, and other equipment to the nearby home of one of their forecasters and established an emergency base. One staff person was dispatched to the Hartford

WSO to maintain contact with the Boston WSFO and the media and to relay information to the emergency base. Another staff member used two telephone lines still in operation at NERFC offices to contact their hydrologic observers and instruct them to phone observations to the forecaster's home. Within a very short time NERFC was able to resume flood forecasting for southern New England. Another NERFC staff member was recalled from vacation in New York State and instructed to report to the Albany WSO where he assumed forecast responsibility for the rest of New England and eastern New York.

NERFC felt that it was able to continue its operations under these emergency conditions without adversely affecting its services. Raising of electrical and telephone lines and installation of a check valve in the basement drain have corrected the problems that caused the flooding (1,4,7).

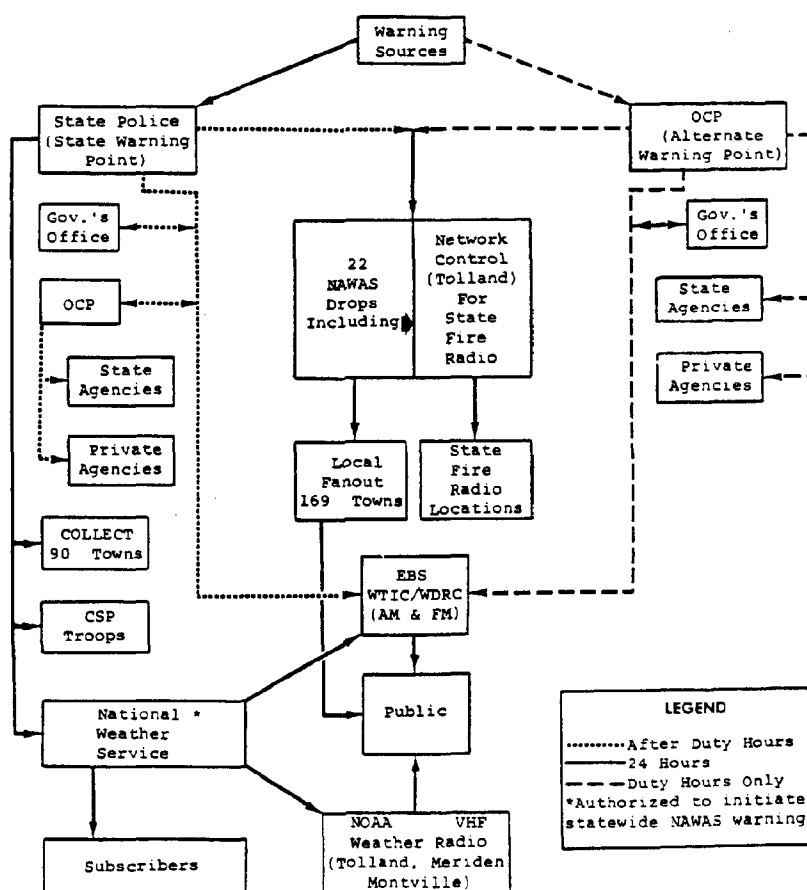
STATE AND LOCAL WARNINGS

The primary State emergency warning point is the Communications Division of the Connecticut State Police in Hartford (Figure 2.5). This warning point is manned 24 hours a day by full-time radio dispatchers. It receives all warnings issued through the National Warning System (NAWAS), the NWS Teletype, and the NOAA VHF weather radio (8,9).

The alternate State warning point is the Connecticut Office of Civil Preparedness (OCP) in the National Guard Armory in Hartford. The alternate warning point is manned during normal working days from 8:30 am to 4:30 pm (8,10).

Because the "Flood Potential Statement" issued by NERFC on Friday afternoon was not a flood warning, it was issued only over the NWS teletype and not over

**FIGURE 2.5: CONNECTICUT EMERGENCY WARNING SYSTEM
FLOW CHART**



Rev. July 1, 1981

Source: Emergency Operations Plan, Part II, Natural Disasters. Connecticut Office of Civil Preparedness, Revised to September 1981.

the NAWAS system (1,16). This was the first time that NERFC had issued that type of statement, and NERFC did not telephone OCP offices to confirm that the message had been received and to discuss the flooding potential (1,4,7). Since the statement was not a flood warning, OCP made no special arrangements to staff its offices for the weekend in anticipation of a flooding emergency, and the OCP Emergency Operations Center was not activated until Saturday afternoon -- after flooding was widespread.

By contrast, in Rhode Island the Providence WSO contacted the director of the Rhode Island State Civil Defense by telephone on Friday morning, June 4, regarding the flood potential for the weekend. The Rhode Island Civil Defense staffed its offices for the weekend in anticipation of possible flooding (1).

The National Weather Service issued specific flood warnings for several of the major rivers in Connecticut: Farmington River, Connecticut River, Housatonic River, and Shetucket River (1,5). These warnings advised local officials of the approximate time and level of flooding to be expected, permitting them to notify local residents and businesses and take other actions as appropriate.

The NERFC also directly notified the flood coordinators in Norwich and Hartford. The early warnings of potential flooding allowed the Norwich Civil Preparedness Director to notify residents and businesses along the Yantic River in Norwich to expect flooding (4,12). Potential flood levels for the Yantic were estimated by NERFC based on rainfall and river stage observations telephoned to NERFC by the Norwich Civil Preparedness Director (5). NWS warnings provided

to the Hartford flood coordinator enabled the City of Hartford to prepare for evacuations along the north and south branches of the Park River (1).

Other towns received only a general warning for urban and small stream flooding throughout the State. These warnings (as well as the warnings for the major rivers) were received by towns at their local warning point (usually local police or fire stations), over the NOAA Weather Radio, and from regional OCP offices and the Connecticut State Police or other source in the Connecticut Warning Fanout, such as State and county fire radio systems. Flood warnings were also broadcast over local radio and T.V. stations (9,10,13).

Once flood warnings were received, local action depended upon the particular system in operation within a town. Typically, the local chief elected official and/or civil preparedness director worked in cooperation with local police and fire departments to periodically monitor streams with known flood potential. Based on their previous experience with local flooding, these officials notified residents of floodprone areas when flooding appeared imminent. Specific warnings for evacuation or flood loss reduction measures were usually not given by local officials much in advance of actual flooding because they had no way to accurately estimate the time and extent of flooding that could be expected (14).

OCP requires each town to have a written emergency operations plan for handling natural disasters such as floods. OCP Area Coordinators review local plans and supporting annexes submitted to their offices and actively encourage towns to review and update their plans at least every two years (11).

Interviews with numerous town officials, including local civil preparedness directors, during the course of preparing this report indicated that almost no towns had written emergency procedures specifically covering warnings, evacuations and other emergency procedures for floods. Personal knowledge of flood potential and flood prone areas by key town officials such as the civil preparedness director, first selectman, and police and fire chiefs, were most often relied upon to provide flood warnings.

Actions based on personal knowledge rather than written procedures appeared adequate to provide evacuation warnings, but inadequate for reducing flood losses. The part time position of most civil preparedness directors may contribute to the lack of written procedures. Interviews also indicated that towns within a ten-mile radius of the nuclear power plants in Connecticut were generally better prepared for natural disasters because of their nuclear accident preparedness plans.

NORWICH SELF-HELP PROGRAM

Norwich has experienced chronic flooding from the Yantic River. In response, the Town developed a strong emergency preparedness program and, with the assistance of the National Weather Service, established a Self-Help Program for monitoring rainfall and river levels to provide advance warning of flood potential. The Self-Help Program includes a group of volunteer observers supplied with plastic rain gages and instructed in observing and reporting rainfall amounts and river levels. The NWS also developed a series of charts for predicting flood levels based on rainfall and river level observations and rainfall forecasts. The Norwich Civil Preparedness Director has developed a close working relationship with NWS and with other Town officials.

NEREC notified the Norwich Civil Preparedness Director of the potential for heavy weekend rain and flooding on Friday morning. The Civil Preparedness Office then notified the Town Manager, police, fire and other local officials, and residents and business owners located in flood prone areas. After

flood waters were observed rising rapidly on early Saturday morning, emergency broadcasts were made over radio station WICH and on WFSB-TV. The banks of the Yantic River were sandbagged at critical points, and sandbags and loads of sand were distributed to local business and residential areas. A total of more than 10,000 sand bags were distributed by the Norwich Civil Preparedness Office in Norwich and surrounding communities.

Serious flooding began around 1 am Sunday and continued to increase until about 10:00 am when flood waters began to recede. Although the flooding had been expected, the height of the flood water was greater than previous floods. Many people, although warned of expected flood levels, had to be rescued from their homes. Some businesses that had prepared by sandbagging the outside of their buildings and raising inventory inside, were hit with water levels higher than expected and suffered extensive losses. (4,12,15)

FLOOD FIGHTING AND EVACUATION

As heavy rains continued throughout the State -- particularly in south central Connecticut -- all day Saturday and into Sunday, severe flooding problems developed. Segments of roads began to wash out as drainage systems clogged or overflowed and water washed across and along roadways and shoulders. In many areas, sections of roads collapsed as saturated soil in road embankments gave way.

As streamflow increased in volume and velocity, many small bridges were damaged or failed as floodwaters washed over or around them or undermined supporting walls. Homes and businesses were flooded or threatened with flooding from overflowing streams. Many small dams were breached or overtopped. In response to these flood problems, local and State personnel began to expand their activities beyond monitoring and warning, to assisting with flood fighting, rescue, and evacuation efforts.

STATE ACTIVITIES

Office of Civil Preparedness. The Office of Civil Preparedness, which operates directly under the Governor, began providing coordination for the flood emergency when the Emergency Operations Center (EOC) at the State Armory in Hartford was activated about 4:30 on Saturday afternoon. Initially the Governor supervised civil preparedness operations from his location at Camp O'Neill in East Lyme. The Governor arrived at the EOC to begin directing activities from there on Saturday night. Initial decisions by OCP were to focus State

resources on life saving efforts and then to redirect them to recovery efforts as life threatening situations decreased. The life saving focus was the predominant activity of State agencies through Saturday night.

The OCP role was primarily to coordinate activities and to serve as a central point for receiving and disbursing information to the Governor, other State agencies, town officials and the news media. Information was received at the EOC from OCP area coordinators, State agencies and towns regarding the areas that were affected by flooding, the degree and type of damages that had occurred, and requests for equipment and supplies. OCP used this information to coordinate with the State Police, National Guard, Department of Transportation and other State agencies for allocation of equipment, supplies, and manpower to the areas in greatest need of assistance. To assist in the flood fighting efforts, OCP, through its central office and five area coordinators, provided about 39,000 sand bags to Connecticut towns. (10,16)

Office of Policy and Management. Beginning Saturday afternoon, Office of Policy and Management (OPM) personnel were assigned to the EOC and assisted OCP coordinate activities with State agencies and municipalities. OCP maintained contact with municipal officials to receive information on local damages and to provide them with information on how to obtain sandbags and other emergency supplies and equipment. OPM also assisted with providing information to the news media and general public on conditions in Connecticut. (17)

State Police. State Police personnel were assigned to the OCP Emergency Operations Center in Hartford for three days.

They assisted with coordination of equipment and personnel requests and providing data on fatalities and bridge washouts to the media.

As a result of their 24-hour public safety functions, the State Police were actively involved in flood emergency activities well before OCP began coordinating operations. The State Police participated in many types of emergency activities, but one of their primary functions was to block off State roads affected by wash-outs and damaged bridges until barriers could be erected by the State Department of Transportation. In those towns without a local police force, the State Police served a similar function for town owned and maintained roads. State police also established alternate routes around blocked roads, manned those routes until signs could be erected, and provided notices to the news media regarding road closing and alternate routes.

Other emergency activities in which State police were involved included making observations at dams that were considered dangerous, providing emergency transportation for other emergency personnel, transmitting requests for emergency equipment to OCP or other State agencies, working with the National Guard, providing warnings to areas where flooding was imminent, assisting with rescue efforts, and controlling access to areas with severe damage to prevent looters and other unauthorized persons from entering the area. Access control was particularly important in the Ivoryton and Centerbrook sections of Essex where the most severe flood damage occurred. A State Police Mobile Command Post was established in Ivoryton and remained in operation for over two weeks. (9)

Connecticut National Guard. The Connect-

icut National Guard became involved in the flood emergency efforts on Saturday afternoon. The Governor requested that approximately 1,000 National Guardsmen on routine weekend maneuvers across the State remain on duty to assist with rescue and flood fighting efforts. These guardsmen were dispatched to areas of the State where additional manpower and heavy equipment available only from the National Guard were needed. The National Guardsmen performed a variety of duties, including providing helicopter transport for the Governor and other State, local and Federal officials to view flooded areas, assisting local personnel with sandbagging the banks of the Yantic River, evacuating stranded residents in several towns, assisting State Police with traffic control, and towing stranded cars from Interstate 95. (9,10,18)

Department of Transportation. The Department of Transportation (DOT) was also extensively involved in providing emergency assistance. Initial DOT efforts were mostly devoted to setting up temporary barricades at road washouts and damaged or destroyed bridges, marking alternate routes around impassable roads and bridges, and making emergency repairs to road washouts. Since about 70 sections of State roads were temporarily closed because of road or bridge damage, mudslides, or water on roads, a major effort by DOT was involved (19,20).

DEP Water Resources Unit. The DEP Water Resources Unit (WRU) monitored NERFC broadcast warnings of overbank flooding on Saturday morning. At 12:15 am a decision was made to go on standby Flood Emergency Alert. At 1:20 pm, OCP called WRU for advice regarding high water at Beaver Brook Dam in Ansonia. At 1:30 pm a decision was made to open WRU's Flood Emergency Operations Center,

and by 2:30 the Center was in full operation with engineering staff on standby. Throughout the emergency, the WRU Emergency Operations Center provided flood hazard assessment and engineering data on dams to OCP.

Saturday afternoon, the Flood Emergency Operations Center contacted DEP District personnel to inventory conditions at State and Federal flood control structures and State-owned dams pursuant to guidelines spelled out in the Unit's Operations and Maintenance Manual. At the direction of the DEP Commissioner, the Flood Emergency Operations Center alerted the Department's Law Enforcement Chief early Saturday evening about the developing problem and arranged for ten trailored boats and about 40 Conservation Officers to standby. The Unit requested Law Enforcement personnel to evacuate by boat residents stranded at the Center Brook Apartments in Hamden. Law Enforcement boats were also made available in several other municipalities.

Early Sunday morning, four field engineer teams were mobilized to provide field reconnaissance on problem dams and reports on critical dams. These teams checked dams in the Greater Hartford, central, eastern, southeastern, and south central areas of the State which experienced the heaviest rainfall and most reports of flood problems.

Condition reports on dams and property damage were taken and relayed to OCP headquarters. On Monday morning, a field team was sent to the Pratt Read Reservoir Dam in Deep River to coordinate emergency work on the structure.

Reconnaissance teams composed of DEP, SCS, and COE personnel were sent into the field early Monday afternoon

to survey flood damage and make a preliminary assessment of stream channel debris clearance and reconstruction requirements. By Monday afternoon, the teams confirmed that seven dams had failed statewide, one of which was State-owned. (21)

Other Agencies. Other State agencies were also involved in the emergency efforts. The **DEP Water Compliance Unit** identified local sewerage facilities that were damaged or overloaded by flooding with a resultant release of untreated or insufficiently treated wastewaters into streams and rivers. Notices to avoid "contact recreation" were issued for several rivers and harbor areas as a result of these discharges. DEP immediately began collecting and testing water samples for bacteria levels and issued periodic updates on water conditions. DEP also contacted industries with their own waste disposal facilities and, in at least one instance, required an industry to cease operations until its treatment process was restored. (18,22)

The Department of Health Services identified areas with disrupted or contaminated water supplies and helped arrange for potable water. It also issued warnings and notices regarding the need to boil drinking water in some areas as a result of damages to public water supply systems and to dispose of food contaminated with flood waters. (23)

At the request of the Governor, the **Corps of Engineers** inspected 65 dams between June 12 and 17. Fifty-nine of these dams had been classified as "unsafe non-emergency" during the original Non-Federal Dam Inspection Program completed by the COE in 1981. Six other dams of concern to DEP had been classified as in poor condition in the original COE inspection program. Only one dam --

Rocky Glen Dam in Newtown -- was found to present an immediate increased threat to lives and property as a result of the June 1982 floods. The COE sent each dam owner a copy of their inspection report. (24,25)

Staff from the central and area offices of the **Department of Consumer Protection's Drug Control Division and Food Division** visited all heavily damaged areas and inspected businesses with food or drug items. They supervised the disposal of damaged food and drug supplies from 50 food establishments and 9 pharmacies in 11 towns (26,27).

Other agencies such as the **Department of Housing** and the **Department of Economic Development** provided information to OCP on damages to businesses and homes that was needed to allocate State resources (16,28,29).

Red Cross. The Connecticut Red Cross cooperated with OCP in providing emergency assistance and maintained a liaison at the EOC beginning on Sunday morning. Operating through its 30 chapters across the State, the Red Cross exchanged information with OCP about damages in different areas.



Removal of contaminated food products from the Shop-Rite store in Norwich. (Photo courtesy of the Norwich Bulletin)

The Red Cross established temporary headquarters in Farmington and alerted all chapters that additional volunteers and supplies were needed. A permanent operations headquarters was opened in the Hamden Police Department on Tuesday, June 9. Beginning Sunday night, additional Red Cross staff and volunteers arrived in Connecticut from neighboring states, the Red Cross Eastern Field Office and National Headquarters. A total of 81 Red Cross personnel were assigned to the Connecticut flood disaster and 600 volunteers from Connecticut and surrounding states assisted.

In addition to cooperating with OCP in the identification of affected areas, the Red Cross worked closely with State and local officials in opening twenty-five shelters in eleven chapters throughout the State (See Figure 2.5). A total of 648 people were provided shelter during the first three days of flooding. Nurses were assigned to each shelter. Flood victims and workers were fed at each of the centers and at additional mobile and fixed feeding centers in shoreline communities. The Red Cross also distributed clean-up kits (mops, brooms, bucket, disinfectant, etc.) and comfort kits (toiletries and personal items).

As flood waters receded, most people were able to return to their homes, and most of the emergency shelters were closed on Monday. A few shelters remained open additional days to house several families whose homes were not safe for occupancy. After the shelters closed, approximately 20 people were temporarily housed in commercial facilities at Red Cross expense. The Red Cross also opened several family service centers on Wednesday, June 9 to provide continuing assistance to needy families. (30,31).

Salvation Army. The Salvation Army assisted in the flood emergency by opening local Salvation Army facilities for emergency shelter and by operating four emergency mobile units to provide food service and refreshments to flood victims and relief workers (32).

TV HELICOPTER RESCUE

A reporter for a Hartford television station, and pilot of the station's news helicopter, spotted fire trucks and police as he flew over the Quinnipiac River on Sunday. Below him an attempt was underway to rescue two men in a small tree surrounded by swift waters from the overflowing river.

The pilot and his cameraman joined the rescue operation using rope supplied by the firemen. They removed the back door of the helicopter, secured the rope inside the helicopter, and tied a loop in the other end. With directions from the cameraman, the pilot circled over the stranded men. When the helicopter was in position, the cameraman dropped the rope to one of the men who slipped the loop in the rope over his arms. The pilot was then able to fly the man to safety on dry ground. The rescue was repeated with the second man. The entire rescue operation took only about ten minutes (33).

TOWN ACTIVITIES

Local fire departments were among the first town personnel to become involved in flood fighting efforts. Overbank flooding of small streams and saturated soil conditions resulted in widespread basement flooding of homes and businesses, and fire departments throughout the State received thousands of requests to pump out flooded basements. Most were busy from Saturday until well into the following week providing pump-out services for area residents.

In many communities fire departments had to delay or reduce their basement pumping chores in order to assist local police and other officials with the more urgent task of providing warnings to residents of flooded areas and assisting in evacuation and rescue efforts. Local police and firemen were assisted by local civil preparedness officials and other town officials and staff in performing functions similar to those carried out by the State Police, Department of Transportation and other State agencies.

WESTPORT YOUTH RESCUED

About 9:30 pm Saturday several Westport teenagers were playfully kicking water at each other while standing on a bridge over Dead Man's Brook in Westport. A 13 year-old girl slipped into the raging water and was pulled under. She was swept under Myrtle Avenue and surfaced on the other side. One of her friends ran along the brook and grabbed for her jacket when he could get close enough. The current was so strong, however, that the jacket pulled off.

The young girl was swept into a curved, 150 foot-long culvert under the Post Road. Another of her friends ran across the road and positioned himself beside the brook where it emerged from under the road. When the girl appeared, he jumped into the brook, grabbed her, swam to a tree and held on. A young man who was working nearby heard the cries for help, rushed to the brook and helped pull the two to safety. The girl was taken by Westport's Emergency Medical Service ambulance to Norwalk Hospital, where she was treated for small cuts and bruises and released. (34)



Norwich residents being evacuated from their homes in a National Guard truck. (Photo courtesy of the Norwich Bulletin)

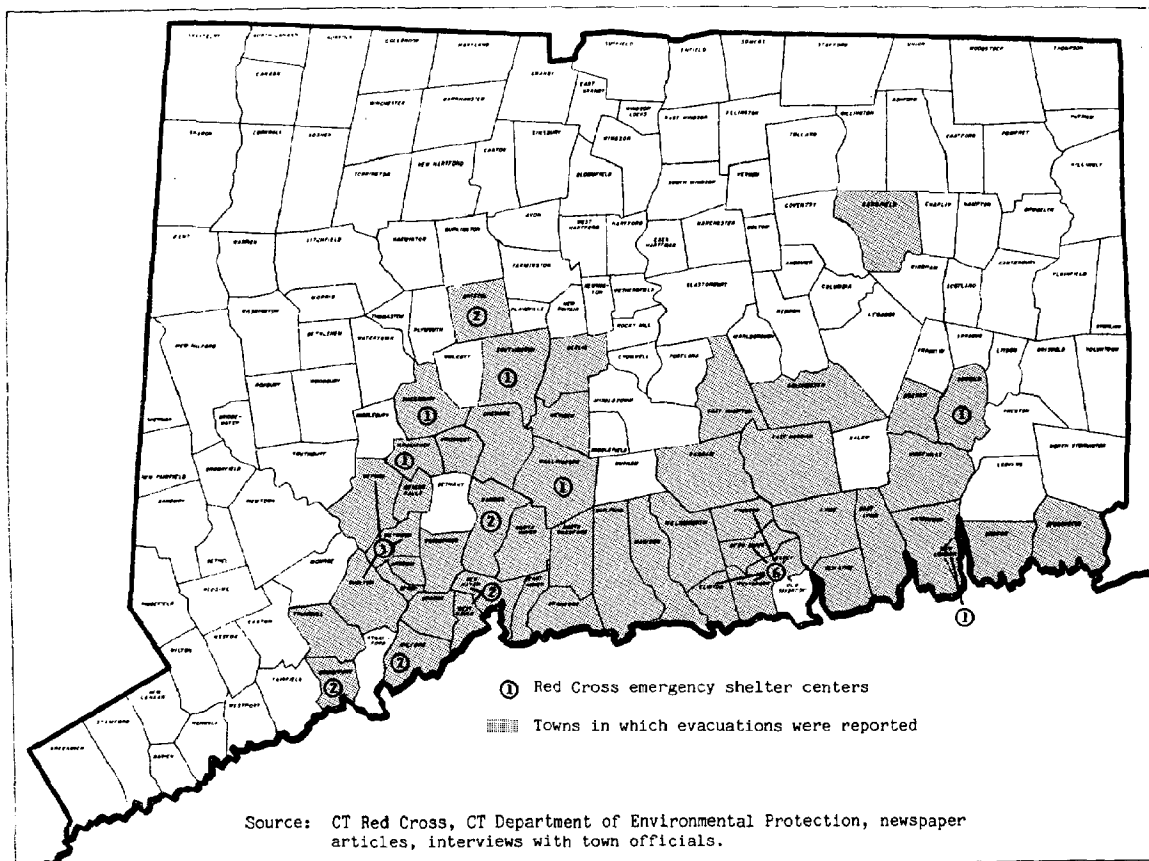
Closing off roads because of flooding, washouts and bridge damage was a major activity in all towns affected by serious flooding. Local personnel were also involved with providing warnings to area residents threatened with flooding or isolation by floodwaters. In many cases police entered areas threatened by flooding and broadcast warnings to residents over loudspeakers. In other areas door-to-door checks were made to warn people.

Statewide, more than 1,300 people were evacuated from their homes (16). Figure 2.6 indicates those towns where evacuations were reported. As people were evacuated, towns opened local armories, schools, community centers and

other municipal buildings as emergency shelters. Sometimes these shelters were operated in conjunction with the Red Cross, but others were provided solely by the towns.

Not everyone received advance warning, and some people became stranded in their homes, unable to reach safe ground on their own. In other cases, people who received warnings of imminent flooding failed to heed them. As a result, local police and firemen, often assisted by State police and the National Guard, conducted numerous rescue operations. Boats and heavy duty trucks were used to bring many people to safety from their homes and vehicles. (18,33)

FIGURE 2.6: EVACUATIONS AND RED CROSS EMERGENCY SHELTER CENTERS



Another unfortunate duty was searching for drowning victims. Ten of the 11 flood-related deaths resulted from people being swept away by flood waters. There were also numerous searches of submerged cars to determine if anyone was trapped inside.

Where possible, town public works crews made temporary repairs to flood damaged local roads to make them passable. In some towns, crews also placed sand bags along the banks of rivers and reservoirs to try and keep them from overflowing. Sandbags were also placed around public buildings, businesses, and residences to try and prevent the entry of flood waters. Where public

buildings were flooded, such as the Town Hall in Milford, town employees worked to recover flood damaged furniture, equipment and records. As flood waters receded, town crews began the work of clearing drains, removing debris, and clearing mud and silt from local streets and other public property.

In areas where damages were particularly severe, local officials declared a state of emergency. In some instances, such as in Essex and Milford, portions of the town were blocked off and access restricted to emergency workers and to residents and businessmen of the affected areas. (14,18)



*Workers begin cleaning up inside the Pratt Read factory in Essex.
(Photo by Danny Hyland)*

FLOOD EVACUATION IN ESSEX

Evacuation in Essex resulted from the actions of local officials and private industry. National Weather Service forecasts and warnings provided no role in Essex. Because of the heavy rain that had been falling since about midnight Saturday, Town officials began observing the Falls River on Saturday morning. An engineer for the Pratt Read Corporation, which owned two dams on the Falls River, also observed the flow of the river and the level of the ponds.

About 6:30 pm volunteer firemen were called out to assist with basement pumping and sandbagging. Around 8:00 pm Clark's Pond began to exceed its banks, and Pratt Read employees began to move material from the floor of the plant and shut off electrical circuits. About 9:00 pm a Pratt Read employee reported to the First Selectman that the Clark's Pond Dam was beginning to overtop. Sometime after 10:00 pm he also called the fire chief to inform him that he was concerned about the condition of the dams.

The First Selectman and fire chief decided that evacuation was necessary, and notice was given to evacuate the Falls River area from Clark's Pond to the Connecticut River. Firemen were told to evacuate homes which would be affected by a 6-8 foot rise in the water level. Over the next hour and a half, the volunteer firemen notified people in the area to evacuate. Using official and personal vehicles, the firemen knocked on the doors of individual houses, notified residents of the potential for flash flooding, and advised them of locations in town where they could go for the night.

At 12:30 am Sunday morning, the Bushy Hill Dam burst and sent a wall of water downstream, washing out about six other dams and devastating the Ivoryton and Centerbrook sections of Essex. Firemen continued to evacuate people and rescue those trapped by the rushing waters. By 6:00 am Sunday floodwaters had subsided enough that firemen could use boats to reach additional people stranded by the floodwaters. Rescue efforts continued until after 9:00 pm Sunday. Surprisingly, there were no deaths and no serious injuries in Essex from the flooding. (36)



Destroyed tax bills being removed from the Milford City Hall basement. (Photo by Bob Coleman, the Milford Citizen)

EMERGENCY DEBRIS REMOVAL AND ROAD AND CHANNEL REPAIRS

As soon as flood waters began to recede and the immediate flood fighting and life saving measures were largely concluded, Federal, State and local personnel began emergency clean-up and repair tasks. Particularly important was the removal of debris from roads, bridges, and stream channels, and their emergency repair.

ROADS AND BRIDGES

The Department of Transportation instituted emergency procedures to make permanent repairs to roads and bridges and temporary repairs to bridges that were destroyed or suffered major damage. Using its own maintenance forces and equipment, supplemented with contracted equipment, DOT began immediately removing debris and repairing road washouts. It also began repairing bridges with minor damage, determining which destroyed or severely damaged bridges could be replaced with temporary spans, and designing permanent replacements for destroyed bridges.

By Monday, June 7, DOT reported that it had reopened 40 of the 70 sections of State roads that had been closed. By the end of the first week following the flooding, all State roads were reported back in service except for sections immediately adjacent to bridges that had been washed out.

Because of the extensive damage to State roads and bridges, DOT supplemented its own resources with private contractors. By Monday, June 7, DOT

had signed no-bid contracts with four construction companies to immediately begin removing debris from damaged bridges and from nearby stream channels. As DOT emergency designs for temporary bridge replacements were completed, additional construction companies were hired. By June 21, 14 construction firms had been hired to perform emergency bridge replacement and reconstruction of washed out roads. To speed the re-opening of State roads where bridges had been destroyed, the Governor, on June 21, directed the contractors to begin working ten-hour days, seven days per week (12,23).

Just as repair work on State roads proceeded at a rapid pace, most Connecticut towns were also busily repairing washed out sections of roads and damaged bridges. These repairs were made by local street and public works crews, frequently supplemented by local contractors.

STREAM CHANNELS

In addition to road and bridge repairs, emergency work was also needed to remove debris clogging stream channels and to repair eroded stream banks. Much of this work was done by towns using their own crews or by contracting to private firms. As indicated above, the State DOT also contracted for debris clearance from stream channels around bridges.

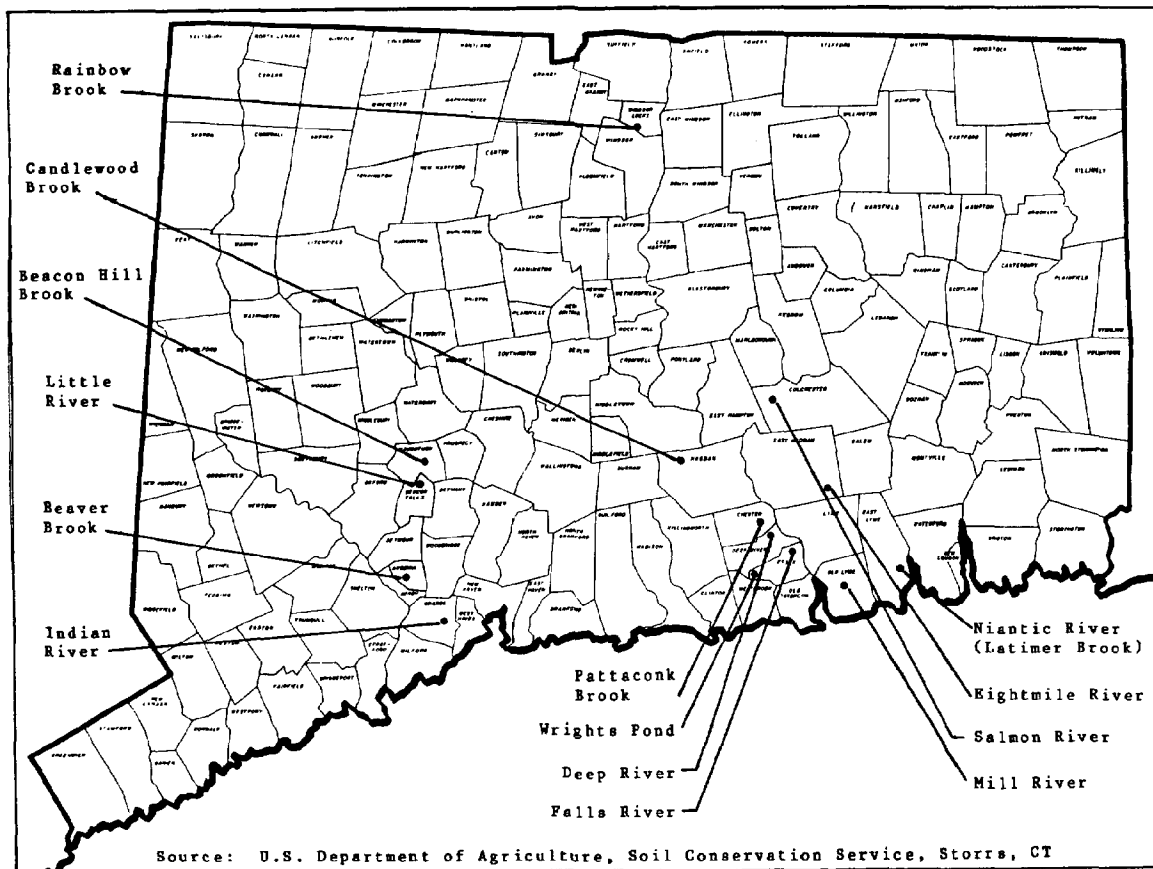
For channel debris clearance and emergency streambank stabilization that required significant expenditures, the U.S. Soil Conservation Service (SCS) provided technical and financial assistance. Under its Emergency Watershed Protection program, Exigency Phase,

the SCS undertook stream improvements that were required immediately to prevent further damage from occurring. The location of these projects are shown in Figure 2.6 and described in Table 2.1.

Based on observations by SCS staff on Sunday June 6 and Monday June 7,

the SCS office in Connecticut contacted the national SCS office and requested immediate funding to permit exigency work to begin. The request was approved and additional SCS personnel were assigned to Connecticut from Rhode Island, Pennsylvania and Massachusetts.

FIGURE 2.6: LOCATION OF SCS EXIGENCY PROJECTS FOR STORM OF JUNE 4-7, 1982



The SCS personnel immediately prepared designs for stream channel stabilization and let the first contracts for emergency work on Wednesday, June 9. Work on the first project began on Thursday June 10, and by the following Thursday, 20 contracts had been awarded in 13 communities. These contracts

included the removal of trash, lumber, trees, homes and cars. Stream banks were seeded to stabilize them, and thousands of tons of riprap were used on stream banks. The total cost of these emergency stream stabilization projects was \$2,655,229. (35)

TABLE 2.1: CONTRACT DESCRIPTIONS FOR SCS EXIGENCY PROJECTS FOR STORM OF JUNE 4-7, 1982

PROJECT NAME	CONTRACT DESCRIPTION	TOTAL COST
Falls River (7 reaches)	Debris and deposition removal, channel reconstruction, bank stabilization and seeding.	\$1,106,769
Wrights Pond (3 sites)	Bridge, debris and deposition removal and seeding	29,500
Niantic River (Latimer Brook)	Tree removal, bank stabilization and seeding	28,850
Candlewood Brook	Bridge, deposition and debris removal, bank stabilization and seeding.	158,860
Rainbow Brook	Debris removal, channel reconstruction, bank stabilization and seeding.	169,263
Beaver Brook	Debris and deposition removal, bank stabilization and seeding.	182,002
Deep River	Bridge, deposition and debris removal.	9,200
Eightmile River	Bridge and debris removal	5,647
Indian River	Debris removal, bank stabilization and seeding.	34,294
Mill River	Bridge, debris and deposition removal, channel reconstruction, bank stabilization and seeding.	121,217
Little River	Debris and deposition removal, and bank stabilization.	62,234
Beacon Hill Brook	Debris and deposition removal, bank stabilization, and seeding.	182,532
Salmon River	Bank stabilization and seeding.	284,079
Pattaconk Brook (3 sites)	Bridge, deposition and debris removal, bank stabilization, and seeding.	276,692
TOTAL COST		\$2,655,229

Source: U.S. Department of Agriculture, Soil Conservation Service, Storrs, CT.

CHAPTER 3

FLOOD LOSSES

Rivers recede, revealing ruin

Economic Farmers take a beating damage as runoff ruins the land broad

By PHIL RIETH

While national guardsmen, state police, emergency personnel, and work crews labored to put those communities plundered by the flood back in some semblance of order, local and state officials spent much of last week compiling a preliminary

Leaders Seeking Damage Totals For Connecticut

O'Neill Says Emergency Is Over for Flood Area

By RICH Special

HARTFORD (UPI)—Flood damage today, still intensified the aid to help repair damage caused by Gov. William O'Neill said that "the basic ended," said Cabinet Thursday. Overall damage estimate is correct its formal application for Federal aid for low-income build homes as well. The preliminary assistance was James Sanders, United States, transportation, survey, by helicopter and several national delegates.

Swift

"We'll have the waters are applications."

By TIMOTHY MICHAELS
Ballett Staff Writer

"That's six-hundred-and-forty thousand acres of watershed coming through my land."

Anton Goulet Jr.'s Pritchville farm sits against an elbow in the Yantic River like a billowing sleeve. The huge watershed keeps feeding the river which has torn at his land six times in the past 12 years.

But it had never done so quite as dramatically as early Sunday morning. This farm was only one of many in the Yantic River valley that took it on the chin from the storm which dumped nearly six inches of rain on the region over the weekend. Young bright green corn stalks, some not yet two inches high, were under water that cut deep

furrows through fields and flattened hay fields for their first mowing. At almost all of Goulet's tilled land is on the plain, and his farm took it the worst. is angular face is taut as he ticks off the flood. age. "Look at it," he says, striding toward a age point across the street from his cow barn. got 15 acres of corn, four inches high, all nd; 30 acres of hay all battered with silt and m. Another 20 acres I had ready to plant. The damm land around and it's all gone to hell. so sick. I don't know where to turn first."

he water had receded some during Sunday noon and the remains were indeed unsettling. mull had been almost free of stones and debris the river took his top soil and dumped tons of rocks and, he fears, glass and scraps of metal

feet above flood stage, much of the Beebe farm is out of the flood plane. From across the river it's a vibrant green.

But up close the Beebe's, on Stockhouse Road in Borrah, have problems too. At 5 a.m. Sunday, with the help of state road crews, they rescued 20 head of heifers which were left stranded on a sliver of land near Route 2. The road crews blocked off traffic on the highway and cut through the guard rails so the heifers could be lead across Rte. 2 to safety.

The Beebes have yet to survey the damage done to their corn fields, but Florence Beebe figures they made out fairly well. But, she says, one 20 acre hay field was, "like a lake."

"The first cut is always the best. We usually have it in the barn by now. And we lost a lot of new fence we just put in."

Her son, Jim, doubts that they can salvage half of the hay that grows on 100 acres. "It's going to rot."

Harry Sachonchik, on Old Baltic Road in Franklin, has twice that number of acres in hay and another 130 in corn.

He spent Sunday afternoon in his garage working on an air compressor, talking about the task he faces as soon as his land dries out enough to work. Illustrating his plight, he draws lines on the dusty top of the compressor to represent the 500 foot long ditches raging water carved out of his fields.

"I'll take a dozer up there," he says placing his hand like a blade on the top of the compressor.

By RICHARD VEILLEUX
Ballett Staff Writer

NORWICH — Free from torrential downpours for the first time since Thursday, area residents Monday began the tedious, heart-breaking task of pulling together the remains of homes and businesses toppled during the worst siege of rains and flooding since the National Weather Service began keeping records in 1904.

Damage estimates for Norwich alone, according to Civil Preparedness Director Rita Frechette, could reach \$20 million while state officials claim the overall destruction may cost Connecticut taxpayers upwards of \$100 million.

Before tapering off to little more than drizzle, the 30-hour deluge had dropped some eight inches of water on Norwich, according to weather service estimates, while other sections of the state were pelted with up to 11 inches.

Roads and bridges were washed out, weakening dams kept officials holding their breath and thousands of home owners struggled to keep cellars clear of water, many with the assistance of area fire departments.

The Yantic Volunteer fire company helped area residents bail out even as they continued around-the-clock pumping at their own station. The rising tides, the basement floors buckling and damage rising into the tens of thousands of dol-

Gov. O'Neill stricken state. F

River, woke to the cloud cracked and cratered trees and shrubbery leaves across mud-filled

Autos that spent the lots along with some of water stood in mute to the fury of the storm.

mud caked in radiators windows fogged with water puddled inside the

The Connecticut co delegation, meanwhile telegram to be sent to Ronald Reagan as so William A. O'Neill reqs flood recovery assistance

The telegram urges to approve O'Neill's request that the Federal Management Agency those cities and towns flooding "disaster areas"

The designation would deny would be eligible housing and home repair assistance and an administration loans and business losses.

And yet, although the disaster of the flooding this century — 12 deaths in the state of 1,200 statewide ev this area — local office were still singing a ha it could have been wor

The Flood/Assessing the Damage

Businesses: Many Close as Owners Ask Federal Help

By DICK LEHR
Courant Staff Writer

Weekend flooding and heavy rains forced many businesses in Connecticut to shut down Monday, leaving hundreds without jobs. Crews started cleaning up the muck and ruined inventories and began repairing damaged factories and shops.

Shopowners and corporate chiefs surveyed stores and factories, assessing damage and brainstorming over the business challenge for which few, if any, had received training in an academic setting. How to recover from a natural disaster.

State economic officials were unable Monday to estimate total business losses, but said workers were surveying towns to get a statewide estimate.

Many businessmen boarded up their stores and shops and reported they were banking on federal aid to recover from the effects of the flood.

The Mite Company in the Westville section of New Haven closed Monday for at least six weeks to

clean up the debris left when 9 feet of water flooded the 150,000-square-foot plant, where sewing machine attachments are manufactured.

Mud covered machinery and desks Monday, and Janet Gargano, the cafeteria manager, swept water and muck from the dining room. "What a mess," she said. The company's 285 hourly workers, who normally get two weeks off at mid-summer, were sent on an early vacation, and will then have to file for unemployment compensation.

Salaried employees will work to restore plant operations. William Ryan, senior vice president, estimated the damage at between \$2.5 million and \$4 million.

In the Norwichtown Mall, a 30-store shopping center located in a flood plain northwest of Norwich, Charles Zablotzky, manager, wandered around Monday in knee-deep piles of soaked food in his Shop-Nite Super Market Inc., ticking off the damage in dollars.

"I lost \$55,000 in frozen foods, \$20,000 in ice cream alone. I had them take \$55,000 of meat to the

dump. That doesn't include equipment or damage to the building," he said.

Zablotzky sounded like a veteran, twice before in the past decade the store, located along the Yantic River, always the first place in the city to flood, has suffered flood damage.

Along the shoreline the weekend tourist trade was washed out.

Many businessmen boarded up their stores and reported they were banking on federal aid to recover from the effects of the flood.

The Valley Railroad in Essex was closed for at least two weeks after floodwaters wrecked a bridge and thousands of feet of railroad, general manager Arnold Freas said.

Freas said the storm caused \$75,000 in damages to the roadbed between Essex and Deep River and another \$30,000 in lost business at one of the state's most popular tourist attractions.

In the Ivoryton section of Essex, Souder Sports, which leases space from the Pratt-Read Corp., was devastated, leaving 65 workers without a job. The company and the Pratt-Read complex sustained heavy damage after two dams burst early Sunday morning.

Company officials stood on Walnut Street Monday in the rubble, where the plant stood last week.

The 163-year-old Pratt-Read Corp., maker of piano keys, was without electricity and mud covered the factory floors. Stockpiles of company lumber were missing, scattered throughout Ivoryton by floodwaters. "It's mind-boggling," said company President Harwood Comstock. Most of the firm's 160 employ-

ees are temporarily without work.

In Milford, among the hardest-hit towns, the Indian and Wepawaug rivers receded Monday, leaving city officials trying to determine how many of its 2,500 businesses were damaged.

The owners of Packaging Plus Limited, North Street, Milford, said a 5-foot-high wall of water roared through their building Sunday. On Monday, 1,500 typewriters, 8,000 sets of luggage and 2,000 watches were scattered. Co-owner William Holadack said he and his partner had no flood insurance. "If the federal government doesn't help us, we don't know what will happen."

Local officials in the Naugatuck Valley Monday credited dams built after the 1955 flood with sparing the area from devastation, but the valley was not unscathed.

Waterbury Mayor Edward D. Bergin said the Mad River played havoc in the eastern section of the city, flooding residential base-

ments and causing millions of dollars in damage.

In East Granby, Rocaari Industries suspended operations, ordering 120 workers to stay home. The company's quarry had 3 feet of water in it.

For some, the aftermath of heavy rains and flooding meant a boom in business, but not necessarily a welcome increase. Plumbers, electricians and floor cleaners were busy Monday checking water and electrical systems, cleaning floors and pumping out cellars.

"You hate to charge people because this is a disaster, but you've got a truck on the road and people working," said Phyllis Cote, a member of a family plumbing business in Old Lyme, Cote & Daughters.

Cote said they began getting calls Sunday from homeowners who wanted hot water heaters, water pumps and circuit breakers checked out after the flooding and power outages.

"We have a waiting list of about 25 homes right now," she said.

INITIAL LOSS ESTIMATES

PRELIMINARY ESTIMATES

During and immediately after the flooding, State and local officials began assessing damages. Many early estimates were made in response to requests from the news media, before reliable estimates were possible. These preliminary estimates were largely based on observations by government officials as they toured damaged areas or participated in emergency operations. In most cases, an accurate assessment of damages was impossible because flooding was still in progress: roads were still covered by flood waters, debris, and silt or mud; stream channels remained full or overflowing; and no systematic survey of damages to residences, businesses,

public buildings and other properties had been performed.

On Sunday, June 6, the Governor's office estimated that damages were in the \$100 million range, but refrained from making further estimates until a complete survey of damages could be prepared. On Monday and Tuesday, individual towns reported estimated damages such as: Milford, \$18 million; Essex, \$30-35 million; Haddam, \$7 million; Deep River \$2-3 million; Norwich, \$20 million; New Haven, \$20 million. Representative DeNardis from the Third Congressional District, which included 16 of the hardest hit towns in south central Connecticut, estimated damages in his district exceeded \$100 million. State DOT officials initially estimated damages to State roads and bridges at around \$7 million. (18)



*Home in Ivoryton swept off its foundation by Falls River
(Photo by Jack Sauer, The Day)*

ESTIMATES FOR DISASTER DECLARATION

Based on the early damage estimates, the Governor declared a state of emergency on Sunday and indicated that he would seek federal financial assistance. Several State legislators and U.S. Congressmen and Representatives also issued calls for a presidential disaster declaration (18). On Wednesday, June 9, Governor O'Neill sent a telegram to the President informing him of Connecticut's intention to seek a Federal disaster declaration. The Governor stated he would submit a formal request for a major disaster declaration on Thursday, June 10 (37).

In accordance with its established procedures and in anticipation of submitting a request for a federal disaster declaration, the Office of Civil Preparedness on Monday began to systematically assemble estimates of damages throughout the State. These estimates were provided by each town, several State and Federal agencies, and the Red Cross.

Each town was required to prepare an estimate of damages within its jurisdiction, broken down into 22 categories. A form for recording and reporting the information along with instructions for preparing the estimates had been provided to the towns by OCP in Advisory Bulletin 11-8 (11/80). As the towns prepared their estimates, they telephoned the results to OCP, where they were tallied for use in preparing county and statewide estimates (16).

State and Federal agencies surveyed damages within their areas of responsibility and reported the results to OCP. The Department of Economic Development (DED) surveyed industrial and commercial establishments in areas of the State with severe flooding. Personnel from

DED headquarters and regional offices contacted local businessmen and town officials to obtain estimates of structural damage, inventory losses, and actual or projected business losses. Estimates on all three types of losses were not available from all businesses contacted (28).

The Department of Housing (DOH) gathered information on damages to residences. Most of the DOH data was collected from individual towns and from the Red Cross. DOH compared the results from these two sources, made some windshield survey field checks of its own and reported the results to OCP. The Federal Emergency Management Agency (FEMA) and the Federal Department of Housing and Urban Development (HUD) advised DOH on the best methods of making rapid estimates of residential damage.

Three categories of residential damage were used: destroyed -- house completely demolished or moved from foundation; major damage -- water above the first floor; and minor damage -- water in the basement. For purposes of estimating amounts of damage, the number of residences in each category was multiplied by a dollar amount considered average for that category. The average dollar amounts used were: destroyed -- \$90,000; major -- \$20,000; minor -- \$5,000. For some towns, dollar estimates provided by local officials were used (29).

The Department of Transportation worked with representatives from the Federal Highway Administration to estimate damages to roads and bridges. The Department of Environmental Protection and Department of Administrative Services worked with representatives from the U.S. Army Corps of Engineers and Federal Environmental Protection Agency to estimate

damages to public buildings and other State property. The Connecticut Department of Agriculture and the Federal Agricultural Stabilization and Conservation Service provided estimates of agricultural damage (16).

Damage estimates from these sources were submitted to OCP from Monday through Wednesday. OCP reviewed and compiled the information according to the categories needed for submission of a request for a major disaster declaration. The total damage estimate based on these rapid surveys was \$276,682,000, divided as follows (38):

Private non-agricultural	\$204,691,000
Agricultural	2,500,000
Public (State or Local Government)	69,491,000

TOTAL	\$276,682,000

The formal request for a major disaster declaration was submitted by the Governor to the President on June 10. It included a description of the State agencies and resources involved in the flood emergency, and an estimate of various types of federal assistance that would be required to help recover from the disaster. A copy of the complete request for disaster declaration is provided in Appendix C.



Pattaconk Brook cut new channels around this bridge over Route 148 in Chester (Photo courtesy of the CT Department of Transportation)

FINAL LOSS ESTIMATES

DEATHS AND INJURIES

Eleven flood-related deaths were recorded on Saturday and Sunday. All were drownings except for one heart attack victim. Most of the deaths resulted from careless action. Four deaths resulted from persons attempting to ride inner tubes or rafts down flood swollen streams. Five deaths occurred when people attempted to cross flooded bridges, either on foot or in a vehicle. The circumstances and locations of the flood-related deaths are shown in Table 3.1 (18,39).

Very few injuries were recorded. The only official account of injuries was prepared by the Red Cross which reported that 12 people suffered injuries, including one person who had to be hospitalized (31).

MUNICIPAL LOSSES

Damages to municipal facilities were well documented. To receive reimbursement from the State and Federal governments for damages to public property, each town had to carefully document all flood related damages. These estimates were then verified by State and Federal agencies. Total damages determined eligible

TABLE 3.1: FLOOD-RELATED DEATHS, STORM OF JUNE 4-7, 1982

TOWN	AGE	SEX	INITIALS	CIRCUMSTANCES	BODY
Bridgeport	15	M	T.G.	Tubing accident	Recovered
Clinton	68	M	C.S.	Swept off water covered bridge	Recovered
Clinton	Unk	F	H.F.	Heart attack while attempting to remove water from cellar	Recovered
Lyme	62	F	J.T.	Passenger in truck swept off bridge	Recovered
Middletown	20	M	J.P.	Rafting accident	Recovered
Milford	65	M	W.G.	Hanging onto auto swept into river	Not Recovered
New London	08	M	C.L.	Drowned in flooded cellar	Recovered
Orange	39	M	R.V.	Passenger in auto swept off bridge	Recovered
Redding	29	M	W.B.	Rafting accident	Recovered
Salem	18	F	J.C.	Swept off bridge while attempting to walk across	Recovered
Wallingford	15	M	R.P.	Tubing accident	Recovered

Source: Age, Sex, Location, and Circumstance of Flood-Related Deaths in Connecticut, June 1982. Toby Kircher, CT Dept of Health Services.

for disaster aid for all units of local government (102 towns, 10 special districts, authorities and associations) totaled \$13,167,132 as of December 1983 (40,41). Table 3.2. lists the losses by eight categories. Figure 3.1 displays the total damages for each town.

This damage total represents the amount of loss reimbursement requested by towns that had been approved by OPM, the Federal Emergency Management Agency (FEMA) and the Federal Highway Administration (FHWA) as of December 1983. Applications to FEMA in the amount of \$248,177

from seven towns were still pending in December, and a few additional applications were expected to be submitted (41). The total reimbursable damages will probably increase after all decisions on eligibility have been made.

In many instances, the amount approved by FEMA and OPM was less than requested by the towns. The approved amounts represent FEMA's determination of damages and other losses that were directly related to the June floods and met all criteria established by Federal regulations. Even though the

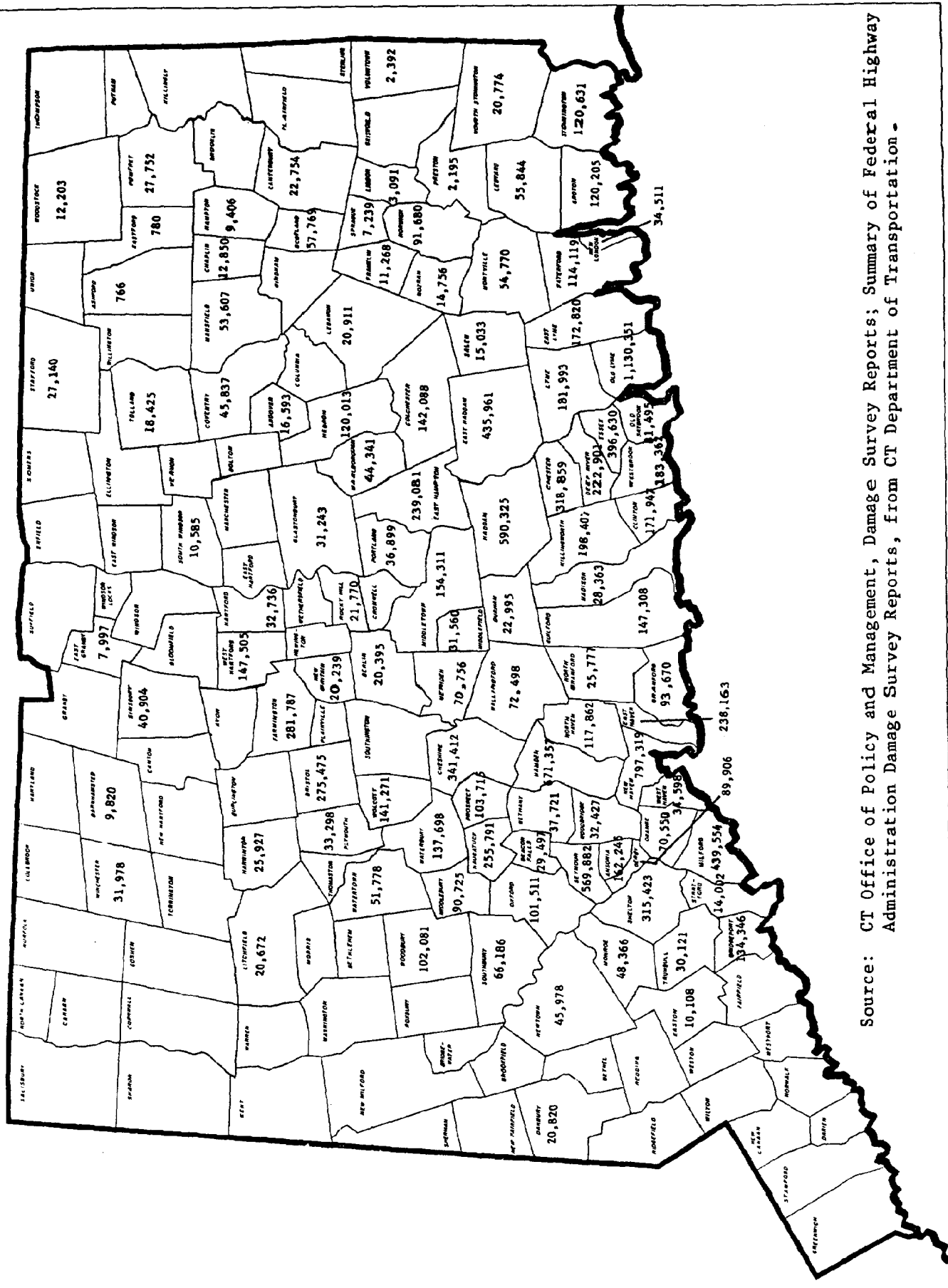
TABLE 3.2: TOTAL MUNICIPAL FLOOD LOSSES BY CATEGORY OF DAMAGE

DAMAGE CATEGORY	FEMA/OPM	AMOUNT FEMA	TOTAL
<u>EMERGENCY ACTIVITIES</u>			
DEBRIS CLEARANCE: on public roads and streets; other public property; and on private property when undertaken by local government forces	\$ 670,247	\$ 79,600 ¹	\$ 749,847
PROTECTIVE MEASURES: life and safety; health; property; stream/drainage channels	886,961		886,961
<u>RECOVERY</u>			
ROAD SYSTEMS: roads; bridges; traffic control; streets; culverts	8,188,845	1,173,378	9,362,223
WATER CONTROL FACILITIES: dikes; drainage channels; levees;dams; irrigation works	520,463		520,463
PUBLIC BUILDINGS AND EQUIPMENT: public buildings; supplies or inventory; vehicles or other equip- ment; transportation systems; higher education facilities	256,481		256,481
PUBLIC UTILITY SYSTEMS: water, storm drainage; sanitary sewerage; light/power	546,002		546,002
FACILITIES UNDER CONSTRUCTION: public facilities; private non-profit facilities	69,882		69,882
OTHER: park facilities; recreational facilities	775,973		775,973
TOTAL	\$11,914,854	\$1,252,978	\$13,167,832

¹ Includes all emergency and temporary work.

Source: CT OPM flood files, and CT DOT listing of Damage Survey Reports.

FIGURE 3.1: MUNICIPAL FLOOD LOSSES REIMBURSED BY FEMA, OPM AND FHWA



entire cost may not have been eligible for reimbursement, towns often incurred repair or replacement costs for the full amount for which they applied. For example, the Town of Old Lyme replaced three bridges at a cost of \$913,913, but was reimbursed only \$835,184 because the replacement bridges exceeded State

design standards. In other instances, towns incurred costs for which they did not submit applications, because they were aware that the costs would be ineligible. (14,17).

The total costs incurred by municipalities for repair and replacement of flood damaged property beyond that

MILFORD CITY HALL

On Saturday evening, June 5, a maintenance crew was assigned to clean up the Milford City Hall, where about an inch of water had seeped into the basement. About 10 pm, the crew had nearly completed its work and one crew member left the basement to report by car radio to a supervisor. While outside, he noticed a large wave of water coming over a small dam in the Wepawaug River just north of City Hall. By the time he returned to the building, water had crashed through the basement windows and flooded the basement with about a foot of water. Water entered the building so fast that the maintenance crew had no opportunity to save any contents. Within the next hour, water reached almost to the ceiling -- about seven feet deep.

The Tax Collector, Purchasing Department, three offices of the Finance Department, and the boiler room were located in the basement. Thousands of tax bills were stacked on tables ready for mailing on Monday morning. The tax bills and other documents from file cabinets were destroyed. Many were washed out of the basement onto surrounding

property. Also damaged were vitally important historical records, such as property lists, land records, and finance records. Practically all equipment and furnishings, including two boilers, were damaged so severely they could not be salvaged.

At 7 am Sunday morning City officials held an emergency meeting. Because the regular phone system was inoperative, an emergency headquarters was initially established in the fire department, where some communications were possible. By Tuesday additional emergency telephone lines had been installed, and the Mayor's office and emergency headquarters were moved to the police department. Temporary offices for the departments formerly located in the basement were established in an unused auditorium of a former school. Since the regular phone system was out of service for about three weeks, numerous volunteers assisted City officials with communications by relaying messages. About four months were required before all offices were permanently relocated to new space in the City Hall or the school building. The basement of City Hall is no longer used. (42)

reimbursed by Federal and State agencies was not determined. However, the approximate amount is indicated by a summary of town applications and FEMA approvals. Excluding the pending applications, at least \$800,000 was requested by towns that was not approved by FEMA⁵ (40). The total non-reimbursed costs were probably about one million dollars. There was also no accounting of municipal administrative costs associated with flood recovery. No State or Federal agency was required to tally the total costs to municipalities. Chapter 6 provides details on municipal losses.

STATE LOSSES

Several State agencies incurred flood related losses, either for damages to State property or for expenses of assisting in the flood emergency. Total State losses and emergency expenditures verified and approved for reimbursement by OPM, FEMA, and the Federal Highway Administration were \$12,670,371 (40,41). These losses are listed by agency in Table 3.3 and by category in Table 3.4.

Department of Transportation. The Department of Transportation's (DOT) reported losses of over \$12 million were by far

TABLE 3.3: TOTAL REIMBURSABLE FLOOD DAMAGES AND EMERGENCY EXPENDITURES BY STATE AGENCY

AGENCY	REIMBURSABLE DAMAGES OR EMERGENCY EXPENDITURES	
Dept. of Children & Youth Services	\$	11,505
Dept. of Consumer Protection		7,260
Dept. of Environmental Protection		506,855
Dept. of Mental Health		5,771
Dept. of Mental Retardation & Corrections		2,802
Dept. of Public Safety (CT State Police)		88,503
Dept. of Transportation	12,029,042	(\$2,171,146 OPM/FEMA) (\$9,857,896 FHWA)
Univ. of Connecticut		8,633
Total	\$12,660,371	
Source: CT Office of Policy and Management, 12/83; Federal Highway Administration, 9/83		

TABLE 3.4: TOTAL REIMBURSABLE STATE LOSSES BY CATEGORY OF DAMAGE

DAMAGE CATEGORY	FEMA/OPM	AMOUNT FHWA	TOTAL
EMERGENCY ACTIVITIES			
DEBRIS CLEARANCE: on public roads and streets; other public property; and on private property when undertaken by local government forces	\$ 34,300	\$ 2,366,108 ¹	\$ 2,400,408
PROTECTIVE MEASURES: life and safety; health; property; stream/drainage channels	413,208		413,208
RECOVERY			
ROAD SYSTEMS: roads; bridges; traffic control; streets; culverts	2,020,959	7,491,788	9,512,747
WATER CONTROL FACILITIES: dikes; drainage channels; levees;dams; irrigation works	13,210		13,210
PUBLIC BUILDINGS AND EQUIPMENT: public buildings; supplies or inventory; vehicles or other equip- ment; transportation systems; higher education facilities	296,078		296,078
PUBLIC UTILITY SYSTEMS: water, storm drainage; sanitary sewerage; light/power	14,132		14,132
FACILITIES UNDER CONSTRUCTION: public facilities; private non-profit facilities			
OTHER: park facilities; recreational facilities	10,588		10,588
TOTAL	\$ 2,802,475	\$ 9,857,896	\$12,660,371
¹ Includes all emergency and temporary work. Source: CT OPM flood files, and CT DOT listing of Damage Survey Reports.			



Damage to bridge on Route 148 in Chester
(Photo courtesy of the CT Department of Transportation)

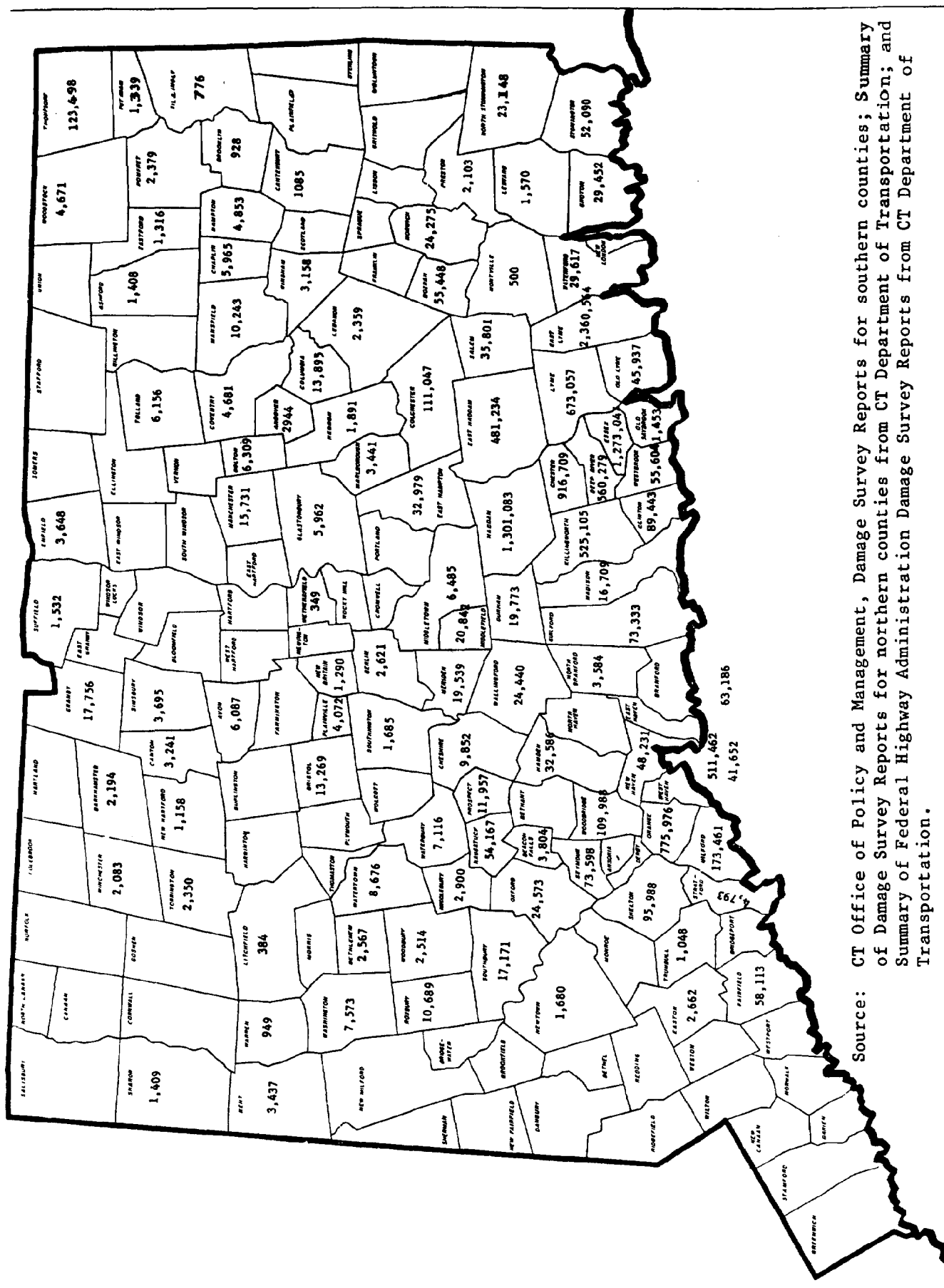
the greatest. Most of these losses were to State bridges and roads. Approximately 70 sections of State roads were temporarily closed because of damages to roads and bridges, 30 State bridges were damaged and had to be repaired, and 17 State bridges were washed out and had to be replaced. The distribution of damages to State roads and bridges is shown in Figure 3.2. Table 3.5 lists the State bridges that were damaged, and Table 3.6 lists those that were destroyed.

DOT reported damages of \$755,291 to the State railroad system. The Waterbury Branch of the railroad was washed out in several places between Milford and Waterbury causing damages of \$275,070. Passengers had to be bussed from Bridgeport to Waterbury for several weeks at a cost of \$26,919 (not reimbursed by FEMA as of December 1983). The collapse of a culvert and catenary tower on the main Conrail (now North-Metro) line in West Haven cost \$507,140 to replace. DOT also reported expenses of approximately \$21,000 for emergency flood relief efforts. (17,43)



*Damage to bridge on Route 1 in East Lyme
(Photo courtesy of the CT Department of Transportation)*

FIGURE 3.2: DAMAGES TO STATE ROADS AND BRIDGES DURING STORM OF JUNE 4-7, 1982



Source: CT Office of Policy and Management, Damage Survey Reports for southern counties; Summary of Damage Survey Reports for northern counties from CT Department of Transportation; and Summary of Federal Highway Administration Damage Survey Reports from CT Department of Transportation.

TABLE 3.5: STATE BRIDGES DAMAGED DURING STORM OF JUNE 4-7, 1982

BRIDGE NO.	TOWN	LOCATION	BRIDGE NO.	TOWN	LOCATION
<u>REPAIR BY CONTRACT</u>			<u>REPAIR BY CONTRACT (CONT'D)</u>		
02504	East Haddam	Rte. 82 over Succor Brook 1/2 roadway closed - upstream side	02937	Chester	S.R. 658 over Pattaconk Brook
02509	Lyme	Rte. 82 over Brook 1/2 roadway closed - upstream side	01380	Wallingford	Rte. 150 over Quinnipiac River
02710	Lyme	Rte. 156 over Beaver Brook 1/2 roadway closed - upstream side	01880	Clinton	Rte. 1 over Indian River
01391	Lyme	Rte. 156 over East Branch Eight Mile River; 1/2 roadway closed - upstream side	02723	East Lyme	Rte. 161 over Cranberry Meadow Brook
02711	Lyme	Rte. 156 over Falls Brook	01534	East Hampton	Rte. 196 over Pocotopaug Creek
02673	Westbrook	Rte. 145 over Menunketesuck River	02781	N. Stonington	Rte. 184 over Shunock river
00361	Groton	Rte. 1 over Pequonnock River Roadway narrowed	00348	Westbrook	Rte. 1 over Menunketesuck River
02510	East Haddam	Rte. 82 over Strong Brook 1/2 roadway to be closed - upstream side	01555	N. Stonington	Rte. 216 over Green Falls River
01390	Lyme	Rte. 156 over Eight Mile River 1/2 roadway closed - upstream side	<u>REPAIR BY MAINTENANCE</u>		
02715	East Lyme	Rte. 156 over Pataganset River 1/2 roadway to be closed - upstream side	01103	Bristol	Rte. 72 over Pequabuck River
02692	Chester	Rte. 148 over Pattaconk Brook 1/2 roadway closed - upstream side	01634	Bozrah	Rte. 612 over Fitchville Pond
01904	Waterford	Rte. 1 over Jordan Brook 1/2 roadway to be closed - upstream side	01375	Lyme	Rte. 148 over Whalebone Creek
			02539	Salem	Rte. 85 over Harris Brook
			02097	Haddam	Rte. 9A over Ruddy Creek
			None - under 6' span	Woodbridge	Rte. 69 over Brook
			02443	Woodbridge	Rte. 69 over Brook
			01853	E. Lyme	Rte. 1 over Brook
			02507	E. Haddam	Rte. 82 over Brook
			02505	E. Haddam	Rte. 82 over Succor Brook

Source: Memorandum to Edwin J. Fijol, Manager of Design, Bureau of Highways, CT Department of Transportation, from John F. Cavanaugh, Engineer, Bureau of Highways, 7/9/82.

**TABLE 3.6: STATE BRIDGES
DESTROYED DURING STORM OF
JUNE 4-7, 1982**

BRIDGE NO.	TOWN	ROUTE AND DESCRIPTION
01327	Orange	Rte. 121 over Wepawaug River
00367	E. Lyme	Rte. 1 over Latimers Brook
02974	E. Lyme	Rte. 1 over Latimers Brook
01402	Montville/ E. Lyme T.L.	Rte. 161 over Latimers Brook
02696	Chester	Rte. 148 over Pattaconk Brook
02694	Chester	Rte. 148 over Pattaconk Brook
00620	Deep River	Rte. 9A over Deep River
02508	Lyme	Rte. 82 over Roaring Brook
03327	E. Lyme	Rte. 1 over Four Mile River
01134	Killingworth	Rte. 80 over Menunketesuck Rv.
01135	Essex	SR 602 over Falls River
01137	Haddam	Rte. 148 over Ponset Brook
02693	Chester	Rte. 81 over Pattaconk Brook
02691	Chester	Rte. 148 over Pattaconk Brook
00619	Essex	Rte. 604 over Falls River
02713	E. Lyme	Rte. 156 over Falls River
2500	Haddam	Rte. 81 over Salt Peter Brook

Source: CT Department of Transportation

Department of Environmental Protection. The Department of Environmental Protection (DEP) had reimbursable flood losses of just under \$500,000. Approximately \$139,000 in damages were to State parks in the southern portion of the State. Another \$23,680 in damages occurred in State parks and to one State-owned dam in the four northern counties. Most of the park damage consisted of washed out sections of park roads. A number of culverts, pedestrian bridges, and foot paths were also damaged.

The largest portion of the DEP reported damages were to the Valley Railroad from Chester to Old Saybrook. The Valley Railroad is owned by the State, but is leased to the Valley Railroad Company for operation, and is a major tourist attraction in the area. The railroad suffered extensive damage to the tracks, embankments, and to the Falls River Bridge and Chester Creek Bridge. Total damages to the Valley Railroad were approximately \$288,500. (44,45)

DEP also reported damages to 15 State-owned dams. The verified damages resulting directly from the floods were placed at about \$11,600. Table 3.7 lists the State-owned dams damaged during the floods. Damages were caused by overtopping and by high flows in the spillways which caused erosion of embankment materials and displacement of masonry. Two small dams failed completely, but the others sustained only modest damage during the floods. (46)

Other flood losses reported by DEP included \$17,600 for emergency debris removal, \$17,800 for emergency flood fighting (sandbagging, monitoring dams, etc.) on both State and private property, and \$8,200 for cleaning up a flood-related oil spill (44,45).

**TABLE 3.7: STATE-OWNED DAMS DESTROYED OR DAMAGED DURING
STORM OF JUNE 4-7, 1982**

NAME	LOCATION	ESTIMATED FLOOD DAMAGES ¹	
		INITIAL	FINAL ²
<u>DAM FAILURES</u>			
Mansure Pond Dam	Chaplin	\$150,000	- ³
Lower Joshuatown Pond Dam	Lyme	50,000	- ³
<u>DAMS REQUIRING REPAIRS</u>			
Beach Pond	Voluntown	210,000	-
Black Rock	Watertown	5,000	-
Lower Bolton	Bolton	50,000	-
Pachaug	Griswold	5,000	-
Higganum Reservoir	Haddam	15,000	\$6,505
Gorton Pond	East Lyme	5,000	735
Leesville	East Haddam	15,000	1,258
Wharton Brook Pond	Wallingford	10,000	832
Ross Wildlife Pond	Sterling	3,000	-
Gardner Lake	Bozrah	5,000	-
Bashan Lake	East Haddam	15,000	1,732
Bibbins Pond	Windham	2,000	-
Pattaconk Reservoir	Chester	5,000	576

¹ Estimates for damages caused by June 1982 floods. Does not include total costs of repair, which in many instances will be much higher because of other work needed which is unrelated to the June floods.

² Damages directly caused by June 1982 floods and eligible for disaster aid, as determined by FEMA.

³ Will not be rebuilt.

Sources: Memorandum from Benjamin A. Warner, Director, DEP, Water Resources Unit, to Senator Eugene Skowronski and Rep. Teresalee Bertinuson, Co-Chairpersons, Environment Committee, 6/25/82; OPM Public Assistance files; Wesley Marsh, DEP Water Resources Unit.

Other flood-caused damages reported by State agencies were minor. The Department of Mental Retardation and Corrections reported minor damages (\$1,857) to the grounds and basement of the Seaside Regional Center in Waterford. The Department of Children and Youth Services reported \$11,505 damages to a sewage pumping station serving the Riverview Hospital for Children in Middletown. The University of Connecticut campuses in Hartford and Groton sustained damages of \$8,633 to buildings and utilities (47). Figure 3.3 shows the location of damaged State property.

Remaining flood-related expenses of State agencies were for emergency actions during flooding. The Department of Public Safety, State Police, incurred approximately \$86,500 in expenses for overtime emergency assistance and equipment damaged during the flood emergency. The Department of Consumer Protection had expenses of \$7,260 for inspection of damaged food and drug products. The Department of Mental Retardation and Corrections had \$945 expenses for mental health aids who had to work overtime because other shifts could not get to work (47).

Manpower costs reported by the agencies included only overtime costs during the period of the actual flood emergency. Regular hours spent on flood related activities were not recorded by all agencies and were generally not available from agency records.

FEDERAL LOSSES

The only federal property affected by the June 1982 floods was the Amtrak railroad from New Haven to Old Saybrook. The heavy rains washed out the tracks

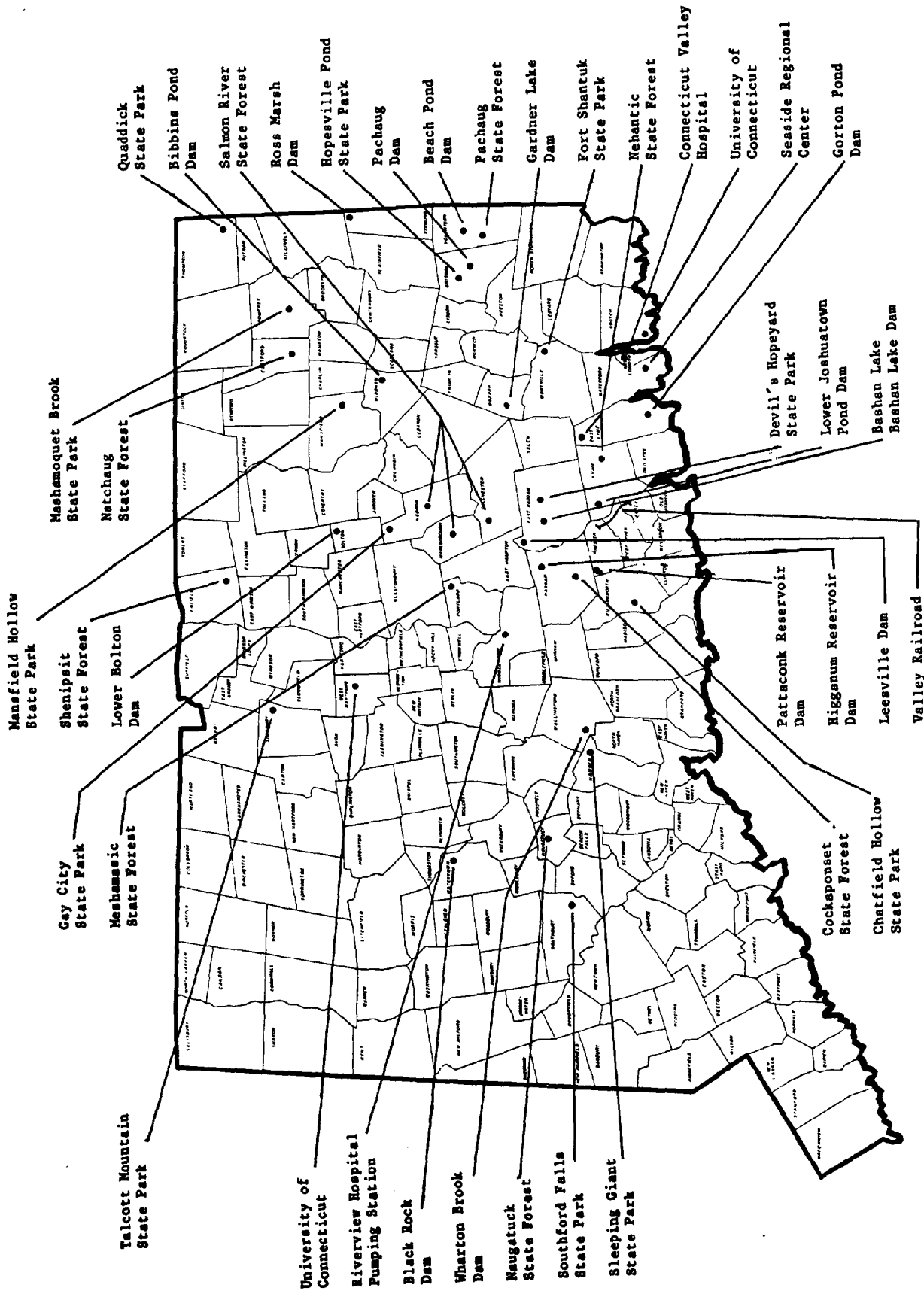
VALLEY RAILROAD

The Valley Railroad is a major tourist attraction in south central Connecticut. A passenger train makes regular runs from a depot in the center of Essex, north along the west side of the Connecticut River, to a ferry landing in Chester. Passengers can then take a riverboat excursion down the river. Special trips further north into Haddam are sometimes made.

The Essex/Chester area experienced some of the heaviest rainfall and most severe flooding, which caused major damage to the railroad and completely halted service. Tracks and embankments were washed out in several areas, and two bridges were badly damaged: one over the Falls River in Essex, and one over Chester Creek in Chester. The Valley Railroad Company, which operates the railroad under a lease from the State, immediately began to repair the Falls River Bridge and damaged segments of the track between Essex and the ferry landing. The repairs were completed and the railroad back in operation by late July 1982. Repairs to the Chester Creek Bridge and portions of the track north of the ferry landing were not expected to be completed until the spring of 1984.

Reimbursement for the cost of repairs was delayed because FEMA initially thought that the railroad was private property and not eligible for Federal disaster assistance. State officials provided deeds and other documentation to convince FEMA that, although the repairs were made by a private company, the tracks were owned by the State and, therefore, repairs were to State property.

FIGURE 3.3: STATE PROPERTY (EXCEPT ROADS AND BRIDGES) DAMAGED DURING STORM OF JUNE 4-7, 1982



Source: Damage Survey Reports, CT Office of Policy and Management; and CT DEP, Water Resources

in a number of locations, and the tracks in New Haven were under water for several days. As a result, service on the Amtrak line between New Haven and Old Saybrook was disrupted between June 5 and 10. During this time, buses were used to transport passengers between stations in New Haven and Old Saybrook. The total cost to Amtrak to repair the damaged railroad was approximately \$667,000 (48).

PRIVATE LOSSES

Residences. Initial estimates of damages to homes were made by individual towns, the Department of Housing (DOH) and

the Connecticut Red Cross. OPM, in preparing the request for disaster declaration, used the estimates prepared by DOH because they were higher than the estimates OPM received from the towns and the Red Cross. The DOH estimates included information supplied to it by towns and the Red Cross, supplemented by windshield field checks of some areas by DOH personnel. DOH divided the residential losses into three categories and applied an average loss value to each. The initial DOH survey yielded the following estimates (49):

Destroyed	37	\$ 3,564,000
Major damage	1,538	28,248,000
Minor damage	15,574	63,679,000
<hr/>		
TOTAL	17,149	\$95,491,000



Washout under the Amtrak railroad tracks in Old Lyme (Photo by Doug Tift)

The locations of the estimated housing damages are shown in Figure 3.4.

The accuracy of both the number and amount of estimated housing damages is uncertain. Interviews with Department of Housing personnel indicated that they felt the estimates were the best they could arrive at given the short time period involved. Nevertheless, potential problems with the estimates were acknowledged: floodwaters were still high in some areas, and assumptions about damages to basements, including

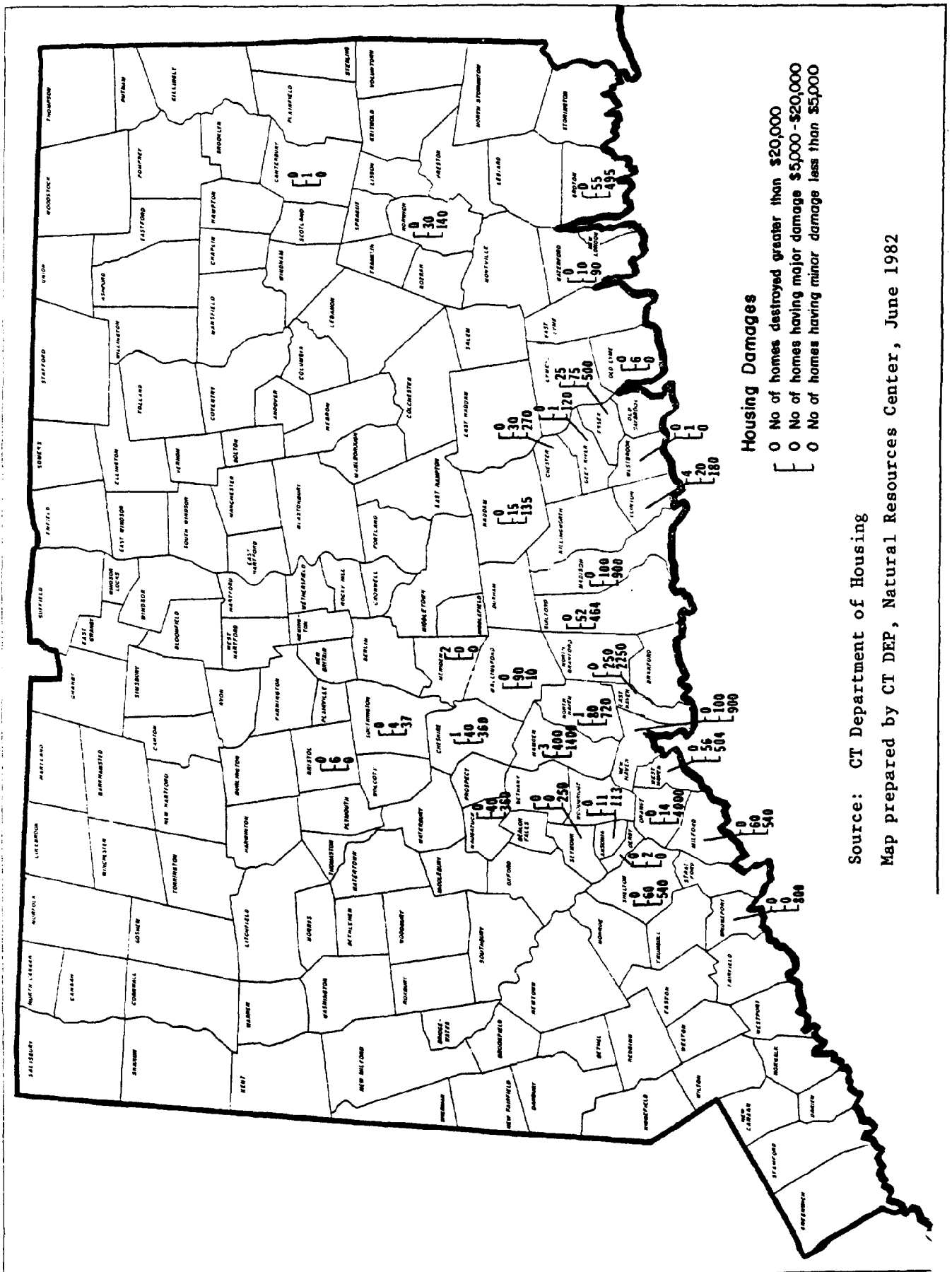
heating systems, were not always correct; and DOH did not perform field checks in all areas, but relied to a large degree on contacts with town officials for their estimates of housing damages. (29)

A comparison of the damages reported by DOH, by the individual towns, and by the Red Cross provides interesting contrasts. The Red Cross made the lowest estimates of housing losses. Their estimate, which was completed on June 9 and covered 14 of the 30 Red Cross chapters in the State, indicated the following (31):



Beach home in Old Lyme toppled when flood waters carved a channel alongside the house (Photo by Jack Sauer, The Day)

FIGURE 3.4: ESTIMATED HOUSING DAMAGES DURING STORM OF JUNE 4-7, 1982



Destroyed	26
Major damage	139
Minor damage	2,764

TOTAL	2,929

OCP records of the estimates submitted by towns indicate a higher number of homes estimated to be damaged, but a smaller dollar estimate (50):

Destroyed	29
Damaged	24,593
Cost	\$46,596,500

Interviews with town officials during the preparation of this report identified homes with minor and major damages in towns for which no residential damages were recorded by DOH or OCP immediately after the flood.

There is a significant difference between the DOH and Red Cross estimates of homes that suffered major damages. The greatest discrepancy, however, appears to be regarding the number of homes that suffered minor damages. Estimates of minor damages were usually made for homes with basement flooding. Estimates of basement flooding were made by field observations of areas flooded, and by the number of requests to fire departments to have basements pumped out. The estimate of \$5,000 damage for each house with minor damage assumed that the water was deep enough to cause major damage to the heating unit and other basement contents. DOH personnel acknowledged that after the floodwaters subsided and basements were pumped out, many homes had received only minor damage. (29)

Clearly, some improved procedure for estimating the number and amount of damages to homes should be developed and used in subsequent flood disasters.

Because of the very large dollar value attributed to minor residential damages -- approximately one-fourth of the total initial estimated damages -- the total damage estimate for a flood disaster can be significantly affected by the accuracy of the estimates of minor housing damages. Inaccurate estimates of the number of homes and amount of damage suffered can lead to erroneous conclusions regarding the need for floodplain management and flood control projects.

Businesses. Approximately 50 towns had businesses that suffered flood losses. The bulk of business losses, however, were concentrated in only a few towns. Milford and Norwich each had around 50 businesses with damages. Chester, Essex, and Hamden each had 20 or more businesses damaged. Bridgeport, Berlin, Clinton, East Haddam, Haddam, Madison, New Haven, Oxford, Seymour, Wallingford, Waterbury, West Haven, and Woodbridge all had between 10 and 20 businesses with flood damages (52). Figure 3.5 shows the approximate dollar amount of business losses by town.

Estimates of damages to businesses were developed by Wednesday, June 10 by the Department of Economic Development (DED). DED information was collected using a combination of interviews with affected business owners and telephone contacts with town officials. OCP also obtained information on business losses as part of the flood loss data it collected from each town. OCP data was based on the estimates telephoned to OCP by town officials. In preparing the request for disaster declaration, OCP used the damage estimates supplied by DED. (16,28)

The official estimates provided by DED to OCP on June 10 cited an estimated \$107 million in damages, including losses

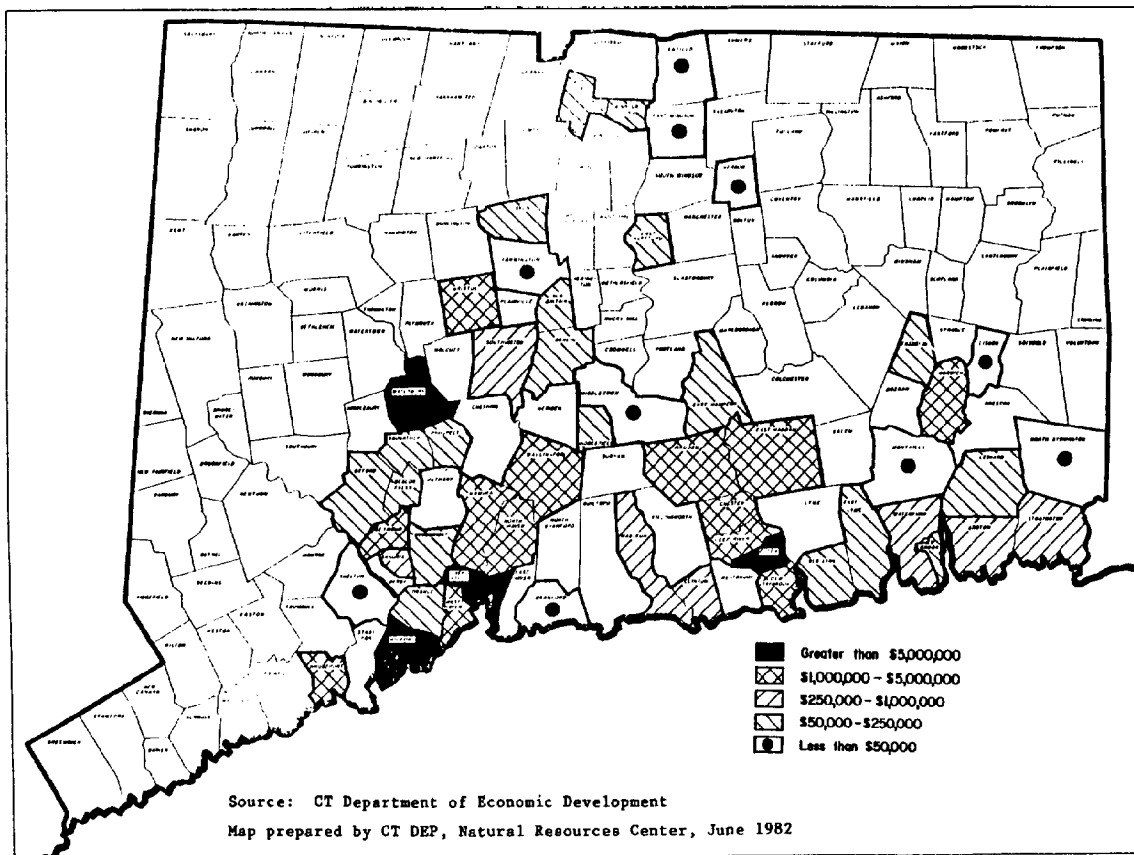
to private utilities. This estimate was based on contact with 922 industrial and commercial firms. The report did not include an estimate of the number of businesses with damages. The report also stated that an estimated 4,100 employees were out of work for a short period of time and another 1,200 employees would be without jobs for up to six weeks (51).

DED files, as of June 10, showed lower estimates of \$89,376,000 in damages to more than 416 businesses. This included \$49,074,000 for industrial concerns and \$40,309,000 for commercial business. DED continued to collect damage information for a few days following submission

of the disaster declaration request, and the final DED estimate for business losses was \$92,691,000. OCP records based on town reports showed damages of \$82,900,502 to more than 419 businesses⁶. This estimate included 11 businesses with more than \$1 million in total losses. The highest estimate for a single business was more than \$15 million.

No systematic, more detailed survey of business damages was performed after the flood emergency period when businesses would probably have had a more accurate assessment of their losses. DED personnel did make follow-up visits to several affected businesses during subsequent

FIGURE 3.5: COMMERCIAL AND INDUSTRIAL DAMAGES DURING STORM OF JUNE 4-7, 1982



weeks and months to find out how they had recovered from the flood and to determine if DED could provide any assistance. A review of a few of these brief follow-up reports indicates that the original estimates made by the businesses were reasonably accurate. Inventory loss estimates showed little change, structural losses tended to be lower than originally estimated, and loss of business estimates were often higher than initially estimated (28,52).

Interviews with businesses conducted during the preparation of this report found some businesses in towns in the northern counties with substantial damages that were not included in either the DED or OCP records. Interviews with town officials also indicated that some businesses were damaged in other towns not recorded by DED and OCP⁷.

Businesses with damages ranging from minor clean-up costs to almost

BEVERAGE SUPPLIER

Flood damages forced a regional beverage supplier to shut down for two days. Located along a river bank, the plant had experienced major flooding once before. Flooding began around 11 pm Saturday, and the local fire chief notified the plant manager at his home that flooding was likely and the plant's electricity should be turned off. As water continued to rise, employees and family members arrived at the plant to help move trucks from the parking lot and load stock onto pallets about eight inches off the floor. Work was made difficult by the lack of light.

Floodwaters receded slightly about 6 am Sunday, but by late morning they increased in level and velocity. Rushing waters eroded the riverbank and began to undermine the building. Using sandbags provided by a local construction company, workers tried to prevent the wall from collapsing. Hydrostatic pressure forced water up through the concrete floor of the building, shooting water six inches into the air. As waters increased in height, entrances at both ends of the building were opened to let the water flow through and ease pressure on the walls. (During the previous major flood, water came in through

one entrance but was blocked by a closed entrance at the other end of the building, and water levels inside the building increased.) The stock resting directly on the pallets was damaged by water that moved through the building, and, when the bottom box became wet, some of the stacks of boxes collapsed causing loss of additional stock. By mid-afternoon the floodwaters began to recede.

Total losses were about \$225,000, including lost inventory, loss of business, dredging of the river channel and repair of the building. Only \$25,000 of the loss was covered by NFIP insurance. The owner applied for an SBA loan to cover remaining losses, but did not qualify for a low-interest loan, and instead obtained a loan from a commercial bank. Release of the insurance money was facilitated by a video tape made by the owner of the flood and damages. The company has since reinforced the wall near the river and installed removable flood shields on all entrances facing the river. In future floods the company plans to sandbag half of the inside of the building and locate all stock on raised pallets within the sandbagged area. (54)

\$1.5 million were interviewed during preparation of this report. With the exception of those in Norwich, most of the businesses did not receive flood warnings from town officials. Because the heavy rains and flooding occurred entirely over a weekend, with the worst flooding late Saturday and early Sunday, many of the businesses were closed and no one was at the site.

The businesses in Norwich and Bridgeport had experienced serious flooding before, and some took preventive actions such as sandbagging, removing vehicles from the site, and raising inventory, supplies and equipment. Others were unaware of the flood potential until it was too late. Previous experience



Damage to the Pratt Read factory in Ivoryton (Photo by Danny Hyland)

TIMES FIBER COMMUNICATIONS, INC

Times Fiber is one of the world's largest suppliers of cable T.V. dropwire and also produces fiber optic cable. Their Wallingford plant is located along the west bank of the Quinnipiac River, with warehouse space on the east bank. They had frequently experienced low level flooding in the equipment yard but never serious flooding. Around midnight, Saturday June 5, water rose to record highs and a tow truck was brought in to remove vehicles from the equipment yard. Between 2 and 4:30 am the water rose about four feet and flooded the warehouse to a depth of over three feet. About 8 am the main building began to flood from water forced up through wooden floors. Employees moved equipment and records to higher locations to keep losses in the main building to a minimum.

Total losses at Times Fiber were almost \$1.5 million, all covered by private insurance. Most of the loss was to inventory parts stored in the warehouse. Very little could be salvaged since most of the items included electronic components and insulating materials. Finished goods in the equipment yard were also destroyed. A chain-link fence prevented much of the outside material from being swept away. Inside the main building the major cost was replacement of the floor. If the waters had reached six inches higher in the main building, expensive electronic testing equipment worth several million dollars would have been lost.

Times Fiber received no warning of the impending flood. They have since instituted a procedure to contact the Meriden Police and NEREC when the river approaches flood levels, and will remove material from lower shelves in the warehouse when water reaches to the level of the warehouse doors.

with floods was an important factor in deciding what action to take. Based on the level of past floods, few expected floodwaters to reach as high as they ultimately did, and much of the damage reduction effort was wasted as water rose above the sandbags and the level to which contents had been raised. In locations that had experienced higher floods in recent years, loss reduction efforts were more successful as businesses tried to protect their property to the previous high water mark. Many businesses had never before experienced flooding and were completely unprepared.

Nonprofit organizations. OPM and FEMA received requests for reimbursement of damages from a few nonprofit organizations. Only two were determined to be eligible. The Northeast Academy of Jewish Studies in New Haven sustained \$169,535 in damages to the lower level of the school. Equipment was destroyed in a science lab, audio-visual room,

auditorium, study hall, library, kitchen and dining room. The Waterford Country School in Waterford had damages of \$23,767, including minor equipment losses and erosion of a road and bridge on the property. (55)

Private utilities. Private water companies, Northeast Utilities and United Illuminating electrical companies, and the Southern New England Telephone Company (SNET) sustained losses from the June floods. Broken and exposed water lines caused by washouts along roads were the principle damages suffered by private water companies. The most severely affected private water utility was the Connecticut Water Company which operates 11 systems serving 26 towns. It incurred costs of more than \$420,000 in flood damage repairs and clean-up (56). Other seriously affected water suppliers were municipal or regional water authorities, such as the South Central Connecticut Regional Water Authority.



*National Guardsmen prepare an emergency stream crossing in Ivoryton
(Photo by Danny Hyland)*

Because there were no high winds associated with the storm, damages to telephone and electrical utilities were not severe for a storm of this magnitude. Some telephone and electrical lines were damaged, however, as trees and utility poles were downed by rushing floodwaters, erosion and saturated soils. SNET reported that about six thousand customers were without telephone service for varying periods. Approximately half of these were in Essex. The remainder were spread across the State, with Hamden and the Westville section of New Haven being hard hit. Total costs to SNET were about \$1 million (57).

The United Illuminating Company reported losses of about \$313,000 for repair of damaged facilities, overtime and contractual costs. Most of the damages were to a flooded substation in the Westville section of New Haven, and for replacement of a transmission structure in West Haven. About 5,300 customers were affected, all but about 500 in New Haven and West Haven. Service was first interrupted at 7:45 am, June 6, and restored to all customers by 12:18 am, June 8. (57) Northeast Utilities indicated it did not suffer major losses, but no detailed estimates were available for this report (58). Newspapers reported



Tantumorantum Road in East Haddam washed out when floodwaters carved a channel around the Middle Pond Dam (Photo by Bill Phylar)

more than 30,000 electrical customers were without service at some point during the storm.

Agriculture. Agricultural damages were due primarily to the intense and excessive rainfall which caused sheet and gully erosion, battering of crops, and crop losses due to submersion and excessive moisture. Initial estimates of agriculture damage were gathered by the U.S. Agricultural Stabilization and Conservation Service (ASCS) based on information supplied to them by various agricultural organizations, such as dairy agents, horticulture experts, county ASCS extension

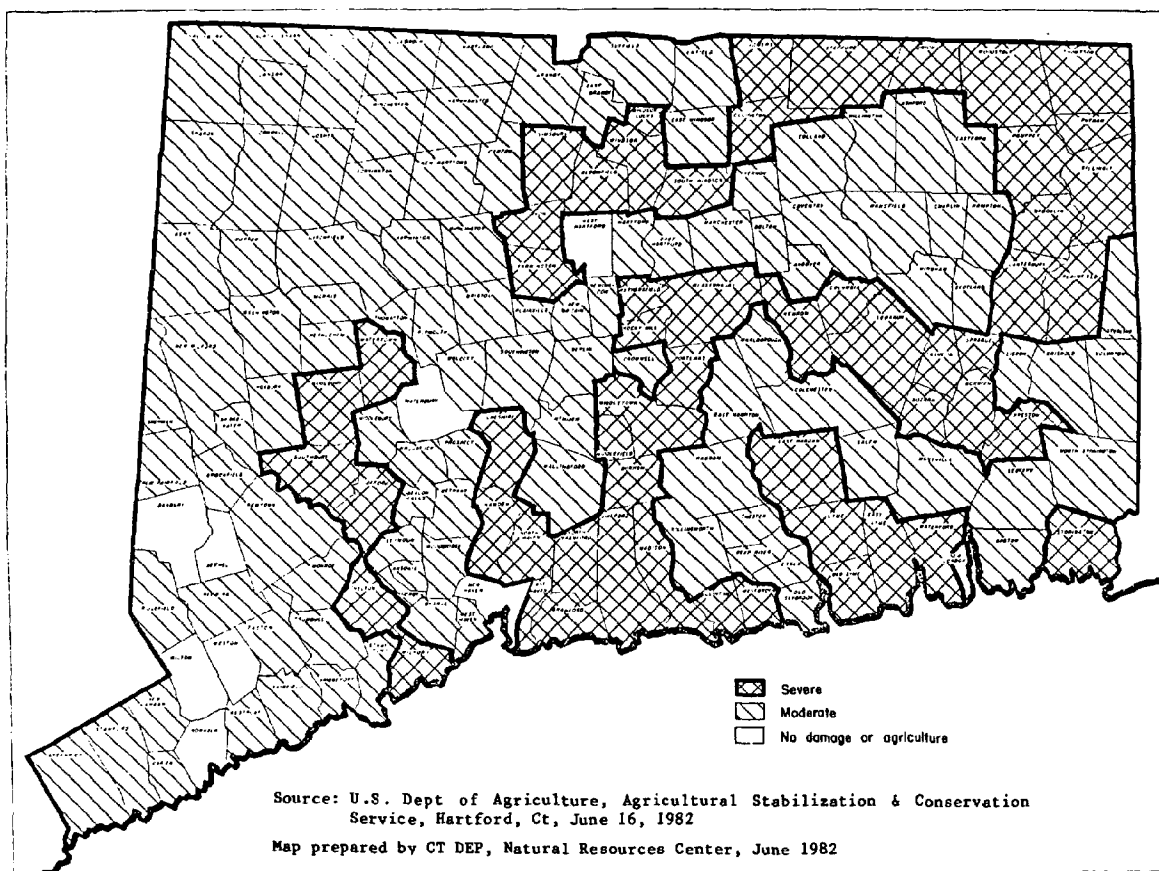
service, SCS and others. These initial estimates were placed at about \$2.5 million. Figure 3.6 shows the distribution of estimated agricultural damages throughout the State. Later estimates by ASCS placed damages as follows:

Crop losses	\$3,891,000
Crop land	311,000
Structures	15,000

TOTAL	\$4,217,000

In addition to these quantifiable losses, ASCS estimated that an undetermined amount of additional agricultural losses --

FIGURE 3.6: AGRICULTURAL DAMAGES DURING STORM OF JUNE 4-7, 1982



probably several million dollars -- resulted from leaching of nutrients, especially nitrogen, from the soil and from loss of topsoil (46).

Privately Owned Dams. In addition to the State and municipal dams that were damaged, several privately owned dams were either destroyed or damaged. Table 3.8 lists the municipal and privately owned dams that were destroyed or damaged during the floods, and Figure 3.7 identifies their location. The DEP Water Resources Unit estimated damages to private and municipal dams at about \$2.5 million. No accurate cost estimates were available for these privately owned dams. (60)

By far the greatest damage to dams occurred in Deep River and Essex, where the privately owned Bushy Hill Dam burst and caused or contributed to the subsequent destruction of several other dams further downstream on the Falls River. This series of dam failures resulted in devastating damages to the Ivoryton and Centerbrook sections of Essex. At the time of the June floods, the Pratt Read Corporation, owner of the Bushy Hill Dam, was under orders from DEP to repair the dam based on findings from the COE Non-Federal Dam Inspection Program. An emergency operations plan was also supposed to have been prepared. Numerous lawsuits by downstream residents and property owners were filed against the Pratt Read Company as a result of the dam failure. (18,21)



*Bushy Hill Reservoir in Ivoryton after the dam burst
(Photo by Bill Phylar)*

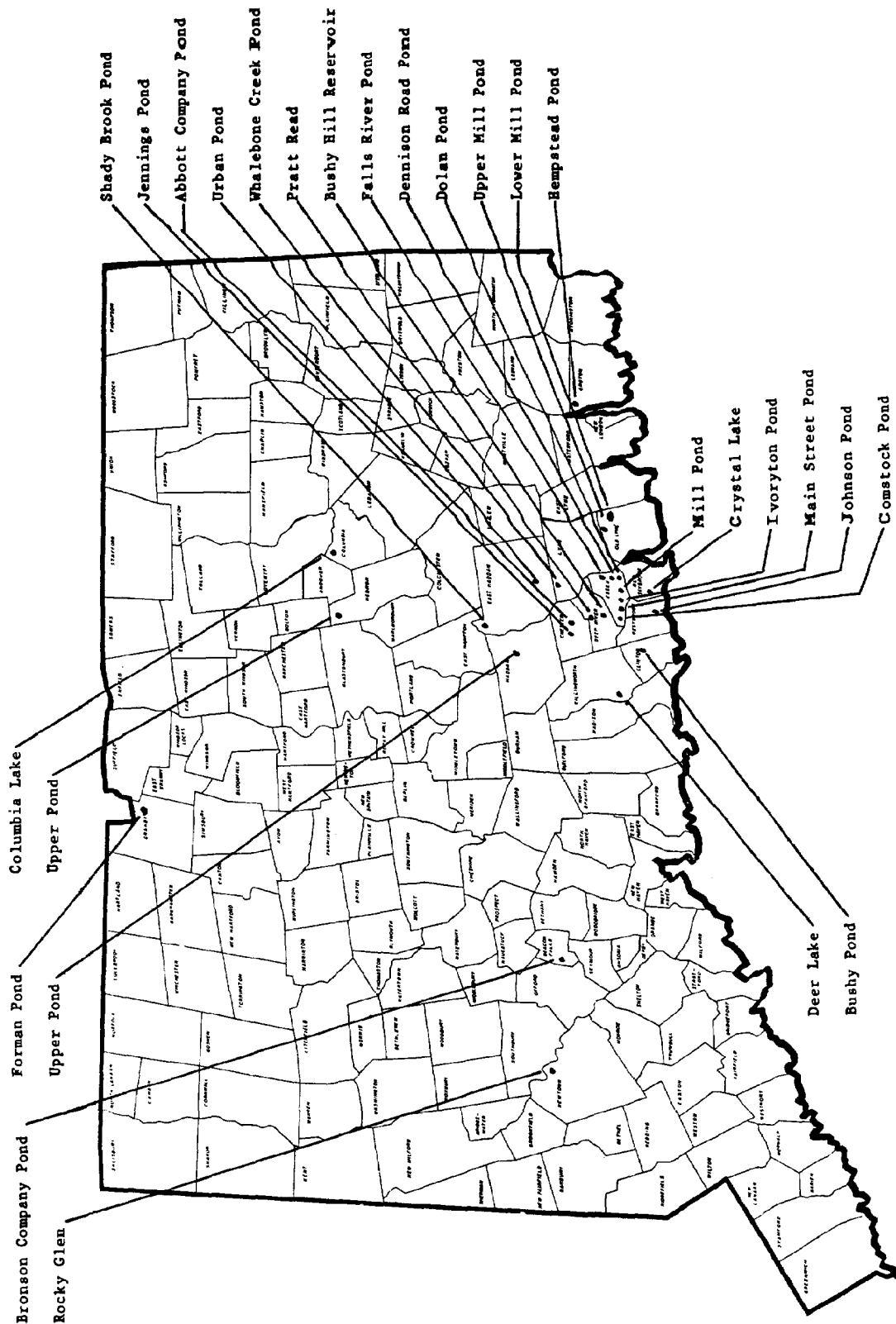
**TABLE 3.8: MUNICIPAL AND PRIVATELY-OWNED DAMS DESTROYED OR DAMAGED
DURING STORM OF JUNE 4-7, 1982**

NAME	LOCATION	ESTIMATED FLOOD DAMAGES¹
<u>DAM FAILURES</u>		
Bronson Company Dam	Beacon Falls	\$ 10,000
Bushy Pond	Clinton	30,000
Bushy Hill Reservoir	Deep River	1,000,000
Comstock Pond	Essex	500,000
Mill Pond	Essex	100,000
Falls River Pond	Essex	50,000
Main Street Pond	Essex	100,000
Ivoryton Pond	Essex	100,000
Forman Pond	Granby	30,000
Holbrook Pond	Lyme	100,000
Whalebone Creek Pond	Lyme	10,000
Lower Mill Pond	Old Lyme	10,000
Johnson Pond	Westbrook	50,000
Deer Lake	Killingworth	100,000
Upper Pond	Haddam	50,000
<u>DAMS REQUIRING REPAIRS</u>		
Mill Creek	Old Lyme	10,000
Dolan Pond	Essex	50,000
Dennison Pond	Essex	50,000
Urban Pond	East Haddam	10,000
Schreiber Pond	Chester	5,000
Hunts Brook	Watertown	10,000
H&R Engineering	East Haddam	15,000
Crystal Lake	Old Saybrook	5,000
Jennings Pond	Chester	25,000
Columbia Lake	Columbia	20,000
Pratt Road	Deep River	25,000
Rocky Glen	Newtown	5,000
Upper Pond	Hebron	5,000
Unnamed Pond	Haddam	10,000
Abbott Pond	Chester	-
Shady Brook Pond	East Haddam	-
Hempstead Pond	Groton	-
Upper Mill Pond	Old Lyme	-

¹ Estimates for damages caused by June 1982 floods. Does not include total costs of repairs, which in many instances may be much higher.

Sources: Memorandum from Benjamin A. Warner, Director, DEP Water Resources Unit, to Senator Eugene Skowronski and Rep. Teresalee Bertinuson, Co-Chairpersons, Environment Committee, 6/25/82; Letter from Wesley D. Marsh, DEP Water Resources Unit, to Rey S. Decker, Hoskins-Western-Sonderegger, Inc., Lincoln, NB, 6/14/83; Wesley Marsh, DEP Water Resources Unit.

FIGURE 3.7: MUNICIPAL AND PRIVATELY OWNED DAMS DESTROYED OR DAMAGED DURING STORM OF JUNE 4-7, 1982



Source: Memorandum from Benjamin A. Warner, Director, DEP Water Resources Unit, to Senator Eugene Skowronski and Rep. Teresa Lee Bertinoun, Co-Chairpersons, Environment Committee, 6/25/82; Letter from Wesley D. Marsh, DEP Water Resources Unit, to Rey S. Decker, Hoskins-Western-Sonderegger, Inc., Lincoln, NB, 6/14/83; and Wesley Marsh, CT DEP, Water Resources Unit

WATER POLLUTION

Immediately after the flooding, the DEP Water Compliance Unit checked with each of the 85 municipal sewerage systems in the State and with many private industries to identify those that had suffered damages. DEP found some damage to about 30 municipal systems and four industrial systems. Most damages were minor. A number of the facilities in older urban areas were overloaded because of the existence of combined sewers, and passed untreated, but highly diluted water, directly to streams. Other systems were rendered inoperable for a period of time. The most severely damaged municipal facility was the Cheshire Sewage Treatment Plant and the main pumping station in Cheshire. Only one private system sustained severe damage.

Based on their findings, the Water Compliance Unit issued notices that sections of 16 rivers and streams and 3 harbors receiving discharges from these damaged or overloaded systems should be considered contaminated. Shellfish beds were also closed in some locations by State or local authorities because of the waste discharges or the excessive rainfall and runoff which normally carries high levels of sediment and contaminants into estuaries and coastal waters.

By Thursday, June 10, DEP removed the contamination notices from most of the streams. Notices for the remainder of the streams were removed by the beginning of the next week. Figure 3.8 shows the location of the damaged sewerage systems and the water bodies that were considered contaminated (22,61).

CHESHIRE SEWAGE TREATMENT PLANT

The Cheshire STP was the most severely damaged sewerage facility in the State. Floodwaters from the Quinnipiac River inundated the grounds of the STP with two to three feet of water. The basement of the central control building was completely flooded, with all of the pumps and electrical equipment rendered inoperable. About 1 1/2 feet of water was in the main floor of the control building. The plant was completely out of commission, and DEP and other inspectors estimated it would take up to two weeks to restore the facility to operation.

However, rapid work by the plant staff, assisted by DEP Water Compliance Unit and others, resulted in the restoration of primary treatment with chlorination after only two days. Since the plant had no electricity, DEP assisted in obtaining a gasoline powered portable pump from the nearby Meriden STP, and a local hardware store owner made available additional pumps and generators. Using this equipment, the plant staff pumped out the basement, removed all of the equipment piece-by-piece, dried it out, and replaced it. Secondary treatment was restored in about two weeks.

A second major problem involved the main pumping station at Johnson Ave. which was inundated and inoperable for several weeks. STP staff used pumper trucks to bypass the pumping station. Sewage was pumped from the collecting basin into the trucks, transported about 3/4 mile to the end of the force main, and then pumped into the sewer line where it flowed by gravity to the STP.

Map of Connecticut showing major rivers and towns. The map includes labels for towns such as Danbury, Waterbury, Meriden, and Bridgeport. Major rivers like the Connecticut River, Housatonic River, and Quinnipiac River are shown. A legend indicates symbols for sewage treatment plant failures, water quality impairment, and shellfish area closures.

Legend:

- Sewage treatment plant failures or by-passes
- Water quality impaired (predominantly due to sewage treatment plant failures)
- Shellfish area closures

Source: CT DEP, Water Compliance Unit and Natural Resources Center files

Stamford Harbor

DAMAGES PREVENTED

FLOOD CONTROL STRUCTURES

Numerous flood control projects have been constructed to control flooding in streams in Connecticut. Stream improvements, such as widening and straightening channels and the addition of riprap, have been performed on many streams throughout the State by towns, acting on their own or with State assistance. Larger flood control projects have been developed by the U.S. Army Corps of Engineers (COE) and the SCS in cooperation with the State. These projects include channel improvements, small detention basins, and larger flood control reservoirs.

Very little information was available on the effectiveness of these flood control projects in preventing flood damages. Interviews with town officials indicated their confidence that flood losses would have been much larger in the June 1982 floods if the town had not previously undertaken local stream improvements for flood control. However, there were no systematic estimates of how much damage was prevented by these flood control projects.

The Corps of Engineers did develop data on prevention of flood losses by projects in which it participates. Most of the COE flood control projects in Connecticut are located in the Connecticut, Thames, Naugatuck and Housatonic River basins. Many of these projects were constructed in the 1960's in response to major flooding of these basins during 1954 and 1955. Figure 3.9 shows the location of these projects, and Table

3.9 shows the total damages that the COE estimates were prevented by its flood control projects in Connecticut, Massachusetts, and Vermont (62,63,64).

FLOODPLAIN MANAGEMENT

Observations and interviews indicated that total damages resulting from the June 1982 flooding, while very large, were less than might have been expected given the amount of rainfall and the record discharges that occurred in many streams. If the estimates of business and residential damages are close to accurate, then the greatest dollar value of damage occurred to businesses and residences. Business damages were concentrated in a few towns that received record flooding -- greater than 200-year return frequency.

The very high estimate of housing damage resulted largely from thousands of flooded basements. Much of this basement flooding was caused by saturated soils rather than from overbank flooding. Many of these homes frequently suffer basement flooding during heavy rains, and their basements were simply flooded to a greater depth during the June 1982 floods. But basement flooding was also much more widespread during the 1982 floods. The record amounts of rainfall, combined with previously saturated soils from rain in late May, caused basement flooding in many homes that had not previously been flooded.

Even the road damage was mostly caused by rapid runoff and washouts rather than overbank flooding. Washed out and damaged bridges were the major losses resulting from excessive stream-flow. All of the bridges that were

TABLE 3.9: DAMAGES PREVENTED BY CORPS OF ENGINEERS FLOOD CONTROL PROJECTS, STORM OF JUNE 4-7, 1982

THAMES RIVER BASIN

PROJECT NAME	YEAR COMPLETED	COST (millions)	LOCATION
Norwich LPP	1949	\$1.3	Shetucket River Norwich, CT
East Brimfield Lake Dam	1960	\$7.0	Quinebaug River Sturbridge, MA
West Thompson Lake Dam	1965	\$6.9	Quinebaug River West Thompson, CT
Mansfield Hollow Dam	1952	\$6.4	Hatchaug River Mansfield, CT
Westville Lake Dam	1962	\$5.6	Quinebaug River Southbridge/Sturbridge, MA
Hodges Village Dam	1959	\$4.4	French River Oxford, MA
Buffumville Lake Dam	1958	\$3.0	Little River Charlton, MA
TOTAL DAMAGES PREVENTED - LOCAL PROTECTION PROJECTS-----			\$4,739,000
TOTAL DAMAGES PREVENTED - DAMS AND RESERVOIRS-----			\$40,530,000
TOTAL THAMES RIVER BASIN DAMAGES PREVENTED-----			\$45,269,000

CONNECTICUT RIVER BASIN including the main stem, the Farmington River and Westfield River Tributaries.

PROJECT NAME	YEAR COMPLETED	COST (millions)	LOCATION
Hartford LPP (including Park River)	1944 1981	\$8.8 \$60.1	Connecticut River Hartford, CT
East Hartford LPP	1945	\$2.4	Connecticut River East Hartford, CT
Colebrook River Lake Dam	1969	\$14.2	W. Branch, Connecticut River Colebrook, CT
Barre Falls Dam	1958	\$2.0	Ware River Barre, MA
Knightville Dam	1941	\$3.2	Westfield River Huntington, MA
Littleville Lake Dam	1965	\$7.0	Middle Branch, Westfield River Huntington, MA
Birch Hill Dam	1942	\$4.8	Millers River South Royalston, MA
Tully Lake Dam	1949	\$1.5	East Branch, Tully River Royalston, MA
Mad River Dam	1963	\$5.6	Mad River Winchester, CT
Sucker Brook Dam	1970	\$2.7	Still River Winchester, CT
TOTAL DAMAGES PREVENTED - LOCAL PROTECTION PROJECTS-----			\$17,163,000
TOTAL DAMAGES PREVENTED - DAMS AND RESERVOIRS-----			\$8,820,000
TOTAL CONNECTICUT RIVER BASIN DAMAGES PREVENTED-----			\$25,983,000

NAUGATUCK RIVER BASIN

PROJECT NAME	YEAR COMPLETED	COST (millions)	LOCATION
Hall Meadow Brook Dam	1962	\$3.1	West Branch, Naugatuck River Torrington, CT
East Branch Dam	1964	\$2.6	East Branch, Naugatuck River Torrington, CT
Thomaston Dam	1960	\$14.2	Naugatuck River Thomaston, CT
Blackrock Lake Dam	1970	\$8.1	Branch Brook Thomaston/Waterdown, CT
Northfield Brook Lake Dam	1966	\$2.8	Northfield Brook Thomaston, CT
Hancock Brook Lake Dam	1966	\$4.1	Hancock Brook Plymouth, CT
Hop Brook Lake Dam	1968	\$6.0	Hop Brook Middlebury/Naugatuck/ Waterbury, CT
Ansonia LPP	1973	\$18.8	Naugatuck River Ansonia, CT
Derby LPP	1973	\$6.1	Housatonic/Naugatuck Rivers Derby, CT

TOTAL DAMAGES PREVENTED - LOCAL PROTECTION PROJECTS-----\$5,241,000
TOTAL DAMAGES PREVENTED - DAMS AND RESERVOIRS-----\$84,090,000
TOTAL NAUGATUCK RIVER BASIN DAMAGES PREVENTED-----\$89,331,000

GRAND TOTAL

LOCAL PROTECTION PROJECTS-----\$37,641,000
DAMS AND RESERVOIRS-----\$139,078,000
GRAND TOTAL-----\$176,719,000

Source: U.S. Army Corps of Engineers, New England Division
Waltham, MA, News Release 82-343, 8/18/82

lost were small. Most were old and were designed and constructed before current design standards were in place.

Interviews with town officials in the less populated areas of the State indicated that, even when they had near record flows, very little damage occurred to homes and businesses other than basement flooding. This was attributed to regulations restricting development in floodplains. Most of the major damage to buildings in floodplains was in the older, more urban towns, where development occurred before current floodplain regulations.

FLOOD WARNINGS

Flood warnings provided by town officials enabled some property owners to reduce their flood losses. The most notable instance of prevented losses was a camera shop in Norwich that was able to move a \$100,000 piece of photographic equipment when the owner received warning of flood potential from the Norwich Civil Preparedness Office (4,12). In Bridgeport, two automobile dealerships greatly reduced their flood losses by removing most of their cars from the sites. However, their action did not result from official flood warnings, but was based on previous flood experiences. Most businesses interviewed indicated that they received no advance warning from local officials.

In most towns, very little advance warning of the severe flooding was available to town officials, and therefore, to residents and business owners. Although almost all of the towns were aware that the NWS had issued flood warnings, the warnings were no different than those

which usually were received two or three times each year, and almost no one expected the magnitude of flooding that actually occurred. Most town officials relied upon their experience with previous floods to determine what emergency actions were needed. But, in south central Connecticut, previous floods were of lesser magnitude than those of June 1982.

Town officials provided warnings to residents only when flooding was imminent. As a result, few people were instructed or had time to prepare for the floods by moving furnishings from homes or relocating inventory from businesses. In general, towns did not have flood warning plans that provided for this type of notice to residents and businesses. Warnings were intended solely for timely evacuation of people as a life saving measure, and did not include provisions for reduction of property losses.

Even in Norwich, which did provide early warnings of flooding, the warnings were not totally effective because the floods were of a greater magnitude than had been experienced before. Some merchants took action to prevent flood losses, only to see their efforts go to waste because floodwaters exceeded the level to which they had sandbagged or raised inventory.

Flood warnings combined with subsequent evacuation and rescue efforts proved effective in preventing injuries and loss of life. Most residents received warnings in time to avoid being trapped in their home. Unfortunately, not everyone heeded these notices, and rescue efforts were necessary in some areas.

It is clear that considerable improvement can be made in Connecticut's

flood warning systems for small streams. The Norwich example indicated that, with a good warning system and a proper preparedness plan, effective action can be taken. It also highlighted the necessity for accurate information regarding the magnitude of flooding and that floodplain occupants must have confidence in the flood projections. Flood forecasts and warning systems need to be established for smaller streams subject to flashfloods and not limited to the major river systems.

After the June 1982 floods, NWS worked with the Town of Essex to develop a flood warning system similar to the one used in Norwich. Local observers were supplied with plastic raingages to measure the rainfall in the immediate area, and NERFC prepared charts that allows prediction of flood levels based on actual and predicted rainfall. The NWS also emphasized the need for automated flood warning systems that can provide a central State or local flood preparedness coordinator with instantaneous records of rainfall and water levels in streams. It feels that an automated system is much more reliable and accurate than a system relying on volunteer observers who may not always be available (7).

SUMMARY OF LOSSES

In preparing this report, each of the Federal and State agencies with responsibility for collecting flood damage information was contacted to try and obtain an accurate accounting of the total damages inflicted by the June 1982 floods. After OCP compiled the initial damage estimate of \$276,682,000 as part of the request for a major disaster declaration, no systematic, updated survey of all flood losses was performed. As a result, 18 months after the disaster it was impossible to determine the actual dollar value of damages caused by the June 1982 floods. Table 3.10 summarizes the available loss estimates. Although no precise, final figure could be determined, the total loss was probably between \$230 and 240 million.

TABLE 3.10: SUMMARY OF FLOOD LOSSES

State Losses	\$ 12,670,000
Municipal Losses	13,356,000
Non-Profit Organizations	193,000
Businesses	92,691,000
Residences	95,491,000
Temporary Housing	800,000
Disaster Unemployment Asst.	424,000
Private Dams	2,490,000
Agriculture	4,217,000
Emergency Stream Improvements	3,465,000
Amtrak	667,000
Tax Abatements	55,000
SUBTOTAL	\$226,943,000
Unaccounted for losses including autos, boats, and municipal and State administrative expenses: \$3-10 million	
TOTAL	\$230 - 240 million

Reasons for the lack of updated estimates include:

(1) Final estimates are not required.

The initial estimate of flood losses was prepared for the specific purpose of obtaining Federal disaster assistance. The Federal government did not require a final, accurate accounting of all flood losses. No State agency had a responsibility to prepare revised, total estimates. An accurate determination of actual damages was required only when a municipality or State agency desired reimbursement for flood losses from the Federal government (or special State funds), or when a private individual or business desired a loan from the Small Business Administration (or special State loan program).

(2) Disagreement over amount of losses.

Differences existed, in some cases, between a town, State agency, individual, or business and a verifying State or Federal agency regarding the amount of damages caused by the floods.

(3) Unreported losses. Much of the flood damage to residences and businesses was not reported to any State or Federal agency responsible for gathering information on flood damages.

(4) Confidential information. Information on residential and business losses gathered by State and Federal agencies was often kept confidential except for summaries of total assistance provided throughout the State.

(5) Program objectives. Information on both public and private damages was gathered and reported by State and Federal agencies for purposes of fulfilling individual program objectives of providing financial assistance to flood victims and for meeting auditing requirements.

It was not assembled with the purpose of contributing to the larger perspective of verifying total flood losses.

(6) Methods of storing and reporting data.

Even when information on actual flood losses was collected by agencies, it was usually not stored and reported in a manner that permitted convenient extraction of the data for purposes other than reporting total assistance provided. For example, information often was not computerized, requiring review of hundreds or thousands of individual assistance applications to retrieve information on damages incurred as opposed to assistance provided; or existing computer programs permitted the extraction and summary only of data on assistance provided and not on damages incurred.

(7) Final costs still undetermined.

The final costs of some flood repairs -- principally to destroyed bridges -- had still not been determined as of December 1983.

(8) Administrative costs. In general, no accounting was available from State agencies and municipal governments concerning the administrative costs of dealing with flood recovery over a period of many months.

(9) Large geographic area affected.

The widespread impact of the floods -- affecting more than 100 Connecticut towns and hundreds of small drainage basins -- made the collection of updated information a time consuming and expensive task.

CHAPTER 4

DISASTER ASSISTANCE AND RECOVERY

Connecticut Begins Struggle To Recuperate From Floods

By RICHARD L. MADDEN
Special to The New York Times

HARTFORD, June 7 — Connecticut began bailing out today as state and local officials struggled to put a price tag on what they said was "astronomical" damage left from a weekend of torrential rain.

"It's an economic tragedy, without a doubt," Gov. William A. O'Neill said of the slow-moving storm that dumped 7 to 11 inches of rain and left at least 12 persons dead or missing across the state since Friday night. The financial damage alone will be "in the multi-millions of dollars," the Governor said.

Only occasional showers fell today and the flooded rivers and streams were starting to recede. But all along

and Old Lyme. Thirteen bridges will have to be replaced and 70 sections of state highways were damaged. An unknown number of bridges and roads maintained by the towns were also destroyed or damaged.

At least 10 washouts on the Northeast rail corridor forced Amtrak to use buses to transport passengers between New London and Bridgeport and the Conrail branch between Waterbury and Bridgeport was out of service. There was no immediate estimate of when service would be restored.

200 Still in Centers

Five sewage-treatment plants in

Connecticut Legislators Vote \$37 Million for Flood Repairs

By MATTHEW L. WALD
Special to The New York Times

HARTFORD, June 30 — The General Assembly approved a \$37 million program of flood-relief measures today to aid individuals, businesses and towns that suffered damages in the floods June 5 and 6, which in many areas of the state were the worst in a century.

Meeting in special session to approve the package, which had bipartisan support, both the House and Senate approved a tax-abatement plan that will allow towns to cut by one-third the property-tax bills of those who suffered flood damage. The state will reimburse the towns for 90 percent of the revenue lost, although no price tag was put on the tax-abatement measure today.

A similar law was enacted in 1979 tornado in Windsor Locks.

Gov. William A. O'Neill, posed the package, said he the legislation tomorrow mor

The General Assembly acted usual speed, delayed occasional lawmakers waited for their b to complete the wording i ments. "This responsibility forth rapidly, and rapid act appreciated by the people c lout," said Representative Stolberg, Democrat of New debate in the House that mainly of clarification about aid would provide.

The \$37 million package, be paid for with state box

both houses unanimously. The biggest part, \$20 million, will pay the state and town share of costs to repair roads, bridges and other public property damaged by the floods. Under a declaration of emergency signed by President Reagan, the Federal Government will pick up 75 percent of the costs in four counties — Fairfield, New Haven, Middlesex and New London — leaving the rest to municipal and state governments.

An application is now pending to have the state's other four counties included in the disaster area.

Low-Interest Loans for Rebuilding

also in the package is a \$10 million

Disaster Relief Trickles to Flood Victims

HARTFORD (AP) — A federal agency, wanting to "light a fire" under a disaster relief program, says the state's lack of coordination and failure to document claims has prevented money from reaching virtually all of the neediest victims of June's massive floods.

"The serious needs and necessary expenses of disaster victims is not being provided on a timely basis," Arthur T. Doyle, deputy regional director of the Federal Emergency Management Agency in Boston, said Aug. 5 in a memo on the state's Individual and Family Grant program.

The IFG program is one of several available to victims of the floods which devastated parts of

Connecticut on June 5 and 6, but it is the only source of aid for some families.

"This program (IFG) moves slow after any disaster," Doyle said Monday.

"We are not in an adversary situation with the state, which is working hard. But we leaned a little heavy on them to light a fire under them. We weren't completely happy with what was happening."

The criticism was rejected by Edward W. Maher, director of the state Department of Income Maintenance — the welfare department — which is responsible for documenting the claims and running the IFG program.

Currently, 2,671 claims are pending, Maher said. He said 84

U.S. Aid Sought For Connecticut In Floods' Wake

Low-Cost Loans Would Pay to Repair Damage

By RICHARD L. MADDEN
Special to The New York Times

HARTFORD, June 8 — As Connecticut's flooding emergencies began to ease today, state and Federal officials intensified their efforts to get Federal aid to help repair the still uncalculated damage caused by the weekend deluge.

Gov. William A. O'Neill, declaring that "the basic emergency situation has ended," said he would meet with his Cabinet Thursday to put together an overall damage estimate. Once that

4 northern counties denied U.S. flood aid

HARTFORD — Federal officials have rejected Connecticut's request that the state's four northern counties be made eligible for federal aid to help repair damage to public property caused by last month's flooding. Gov. William A. O'Neill announced Tuesday.

"If there is no appeal from this ruling, state and local governments will now have to assume the responsibility of restoring public property damaged in the June storm," O'Neill said.

The governor said he is disappointed with the federal decision but added that the \$37 million flood aid program passed

State Gets Disaster Aid Designation

By MICHELE JACKLIN
Courant Staff Writer

President Reagan declared Connecticut a major disaster area Monday, clearing the way for thousands of property owners who sustained heavy losses in this month's flooding to begin applying for millions of dollars in federal aid.

Gov. William A. O'Neill and members of the state's congressional delegation were informed of Reagan's action about 8 p.m. The disaster designation will en-

during the recent special session of the legislature "will be sufficient to meet those needs."

President Reagan declared portions of Connecticut's four southern counties disaster areas on June 14 after state officials reported that the severe June flooding had caused more than \$277 million in damage to the state.

Connecticut officials requested on June 22 that eligibility for federal aid for flood damage to public property be extended to the northern counties of Hartford, Litchfield, Tolland and Windham.

together completely," said James Silk, FEMA's deputy disaster response director for Connecticut.

Maher said his agency must move carefully because any payments made to ineligible flood victims would have to be paid back to the FEMA by the state. "If that happened, we would be criticized even more heavily than we are now," Maher said.

In his memo to the Department of Income Maintenance, Doyle said the state is failing to set priorities on which claims are the neediest.

The memo says that 95 percent of all claims were returned to welfare department field officers because the claims had been sent to state review panels without adequate documentation.

The memo also says the welfare department has failed to keep track of relief provided by the federal Small Business Administration. "Somebody is not putting the file

Doyle and other federal officials said some delays are unavoidable. Unlike other relief efforts, the program is one off last resort, they said.

This means the IFG program aids only flood victims who do not receive all the relief they need from other agencies, such as the SBA and Red Cross.

And Doyle conceded the welfare department's job is "very, very tough" because it must await information from the SBA and other offices before deciding on whether to mail checks.

But a separate program designed to help families with minor home repairs has been more successful, sending a total of \$187,000 to 686 households, Doyle said.

THE RECOVERY PROCESS

Clean-up, repair and rebuilding of property damaged by the June floods began as soon as water receded and people were able to start work. Most minor repairs to public and private property were completed within a few days or weeks of the flood. Major repairs, such as destroyed bridges or severely damaged or destroyed homes and businesses required months to repair or rebuild. Eighteen months after the June floods, the recovery was still not complete.

Most remaining work involved repair or replacement of bridges and culverts.

Flood recovery was aided by financial and technical assistance from Federal and State governments and from private organizations. The amount of financial aid available from the Federal government was greatly increased when Connecticut was declared a major disaster area. The following sections describe the types of assistance that were available and how they were used to help State agencies, towns, businesses, farmers, and residents recover from the 1982 floods.



*A washed out section of Colony Road in East Lyme being rebuilt
(Photo by John Ligos, The Day)*

FEDERAL DISASTER DECLARATION

After touring severely affected areas of the State by helicopter and automobile on Sunday and Monday, Governor O'Neill announced his intention to seek Federal assistance for flood recovery. On Thursday, June 10, the Governor submitted a formal request to the President (see Appendix C), asking that all of Connecticut be declared a major disaster area. The regional office of the Federal Emergency Management Agency (FEMA) in Boston reviewed the request and sent representatives to Connecticut to verify the extent of the flood damages.

Based on FEMA's recommendation, the President declared a major disaster for Connecticut on Monday, June 14 (FEMA 661-DR-CT). However, the declaration was limited. The entire State was declared a major disaster area for purposes of Individual Assistance, making available various Federal grant and loan programs to individuals and businesses throughout the State. Only the four southern counties (Fairfield, New London, Middlesex, New Haven) were declared a major disaster for Public Assistance, making municipalities, non-profit organizations and State agencies with damages in these counties eligible for Federal reimbursement of 75 percent of eligible flood losses.

Initial damage estimates obtained by OCP from the towns indicated that many towns in the four northern counties (Windham, Tolland, Hartford, Litchfield) had sustained damages greater than some towns in the four southern counties -- particularly Fairfield County. The Governor, OCP, and OPM felt that it would not be equitable for towns in the southern counties with relatively minor damages to receive federal reimbursement for 75 percent of their losses while towns in northern counties with

greater flood losses were required to pay the entire cost of recovery. (16,17)

OCP gathered additional information comparing damages to selected towns in all eight counties. On June 22 the Governor sent a letter, along with supporting information, to the FEMA Regional Director in Boston requesting that the four northern counties also be declared a major disaster area and made eligible for Public Assistance (16,65). FEMA responded on July 8, 1982 and denied the request. FEMA stated that:

"... the severity and magnitude of the remaining damages does not appear to be of major disaster proportion. These damages consist mainly of small projects, scattered over a wide area, which produce no significant problems to traffic, public health or safety. The existing situation is considered to be within the capabilities of the State and local governments and, therefore, your request cannot be approved." (66)

Centers for Disaster Assistance. FEMA is the Federal agency that coordinates most of the public and much of the private assistance provided by Federal agencies. Following the major disaster declaration on June 14, the Disaster Assistance Division of the FEMA Region I office in Boston began preparations to work with the State of Connecticut. Several representatives from the Corps of Engineers, Environmental Protection Agency and other Federal agencies were assigned to work with FEMA and State agencies on the disaster.

FEMA personnel worked with staff members from OCP and OPM to identify

appropriate locations for establishing disaster offices. Middletown was selected as the site for the Disaster Field Office (DFO) because of its central location and nearness to State offices. The DFO opened on June 16 and remained in operation until September. The DFO served as headquarters for Federal and State agencies working with municipalities from the four southern counties to determine flood damages to public facilities.

On Friday, June 18, Disaster Assistance Centers (DAC) opened to assist individuals, homeowners, and businessmen who suffered flood losses. DAC's were established at six locations in the southern part of the State: Essex, Hamden, Milford, Naugatuck, New London, and Norwich (Figure 4.1). Each center was open daily from 10 am until 8 pm, except Sunday when they were open from 1 to 8 pm. Each of the six centers remained open for seven days, until June 24.

Flood victims were advised to visit the center nearest them to determine if they would be available for one or more types of flood aid provided by numerous Federal and State agencies. Victims were also encouraged to bring with them any evidence of their flood losses, such as photographs and an inventory of losses. Farmers were advised to visit their county ASCS and SCS offices for information about financial assistance for agricultural losses.

FEMA determined which Federal agencies and OPM which State agencies would have representatives at the DACs to assist individuals and businesses. Federal representatives included FEMA, the Small Business Administration (SBA), Internal Revenue Service, Social Security Administration, and the Veterans Administration. State agencies included OPM,

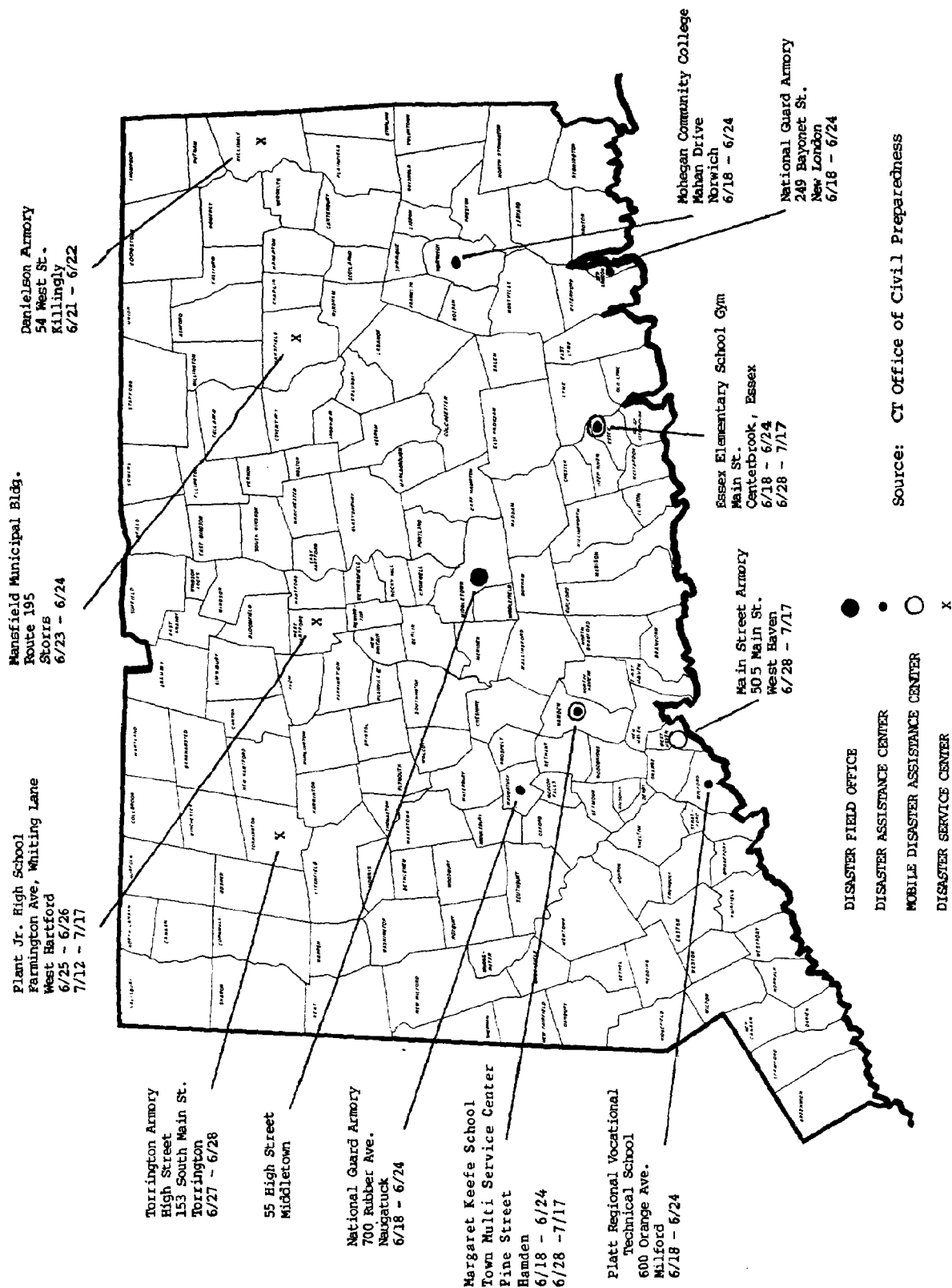
Department of Housing (DOH), Department of Income Maintenance (DIM), Department of Labor (DOL), Department of Insurance (DOI), Department of Aging (DOA), Department of Mental Health (DMH), Department of Consumer Protection (DCP), Department of Children and Youth Services (DCYS), and Department of Environmental Protection (DEP). In addition, representatives from the Connecticut Bar Association provided free legal assistance and Red Cross representatives were present at each center. OPM staff at each center served as intake and exit interviewers and assisted DAC managers.

In addition to the six DAC's serving the four southern counties, a traveling team of disaster assistance workers served the needs of victims in the four northern counties. The traveling teams of Federal and State representatives established mobile DAC's in four locations: Killingly, Storrs, West Hartford, and Torrington (Figure 4.1). From June 21 through June 28, the teams spent two days each at the four temporary DAC's helping flood victims determine if they were eligible for disaster assistance and helping those eligible complete applications for individual assistance programs. Each center was open from 10 am until 8 pm.

A toll free hot-line for disaster information was also provided from June 17 through July 30. This line was used to provide flood victims with information about the types of disaster assistance that might be available to them and to inform them of the nearest DAC or appropriate State or Federal agency office they should visit to fill out an application for assistance.

After the six DAC's closed on June 24, three Disaster Service Centers were opened in Essex, Hamden, and West

FIGURE 4.1: LOCATION OF CENTERS PROVIDING ASSISTANCE TO FLOOD VICTIMS



Haven from June 28 through July 17. Another Service Center was opened in West Hartford from July 12 - 17 (Figure 4.1). These Service Centers were staffed by a smaller group of State and Federal representatives providing information primarily about SBA home and business loans, housing assistance, and the Individual and Family Grant Program (IFG). Each center was open from 9 am to 5 pm Monday through Saturday and 11 am to 7 pm on Wednesday.

As a further effort to see that needy flood victims availed themselves of the individual assistance programs FEMA established teams of outreach workers based at the Disaster Service Centers in Essex, Hamden and West Haven. These teams telephoned and visited community leaders and individuals in areas affected by flooding throughout the State in order to identify flood victims still needing assistance. They helped house-bound flood victims file applications for assistance and referred individuals to the appropriate government agency or private organization.

When the Disaster Assistance Centers closed on June 28, a total of 3,527 individuals had registered at the centers. A breakdown of the types of assistance sought by these applicants is provided in Table 4.1. During the time that the Disaster Service Centers were open, another 729 persons registered for possible assistance, bringing the total registrants to more than 4,200.

After the Disaster Service Centers closed on July 17, SBA continued to provide representatives at the Disaster Field Office in Middletown until August 13 -- the application deadline for physical disaster loans. During the final week before the deadline, SBA loan officers made a last visit to ten locations (West

TABLE 4.1: REGISTRATIONS FOR PERSONAL AND BUSINESS ASSISTANCE AT DISASTER ASSISTANCE CENTERS

TYPE OF ASSISTANCE	# OF REGISTRANTS
Temporary Housing	1,984
SBA Interviews	3,108
Home/Personal	2,445
Business	327
FmHA Interviews	4
Applications Filed	3
ASCS Interviews	2
Applications Filed	-
DUA Claims Filed	7
Job Placement Interviews	-
Legal Services Referrals	60
Debris Removal Interviews	-
VA Interviews	2
SSA Interviews	162
Individual/Family Grant Applications	2,097
Food Stamp Applications	127
Welfare	14
Red Cross	936
Mennonites	-
Salvation Army	-
Mental Health	89
Dept. of Economic Development	311
Dept. on Aging	160
Dept. of Consumer Protection	654
Internal Revenue Service	3,077
TOTAL REGISTRATIONS	3,527
Source: CT Office of Civil Preparedness files	

Hartford, Torrington, Killingly, Storrs, Norwich, Milford, Naugatuck, New London, Essex and Hamden) to receive completed applications, answer questions and provide individualized assistance. (16,17,18,67)

August 13 was also the deadline for the housing assistance programs and Individual and Family Grant Program. The Department of Housing provided housing assistance representatives at the Department of Housing in Hartford as well as at the DACs. The Department of Income Maintenance provided representatives at regional offices and the central office in Hartford as well as the DACs (29,68).

EMERGENCY STATE LEGISLATION

Public Act No. 82-1. On Friday, June 18, Governor O'Neill called for the Connecticut General Assembly to meet in a Special Session, beginning June 28 (69). The Governor prepared a five-point program of flood assistance that he asked the Legislature to enact:

- o Approve \$20 million in bonding to help repair and replace State and municipal public facilities. Funds would be used to provide the 25% matching needed to obtain 75% federal funding for towns in the northern counties, and an equivalent share for towns in the southern counties .

- o Approve \$5 million in bonds for the Department of Housing to make low interest loans for reconstruction or rehabilitation of flood damaged homes.

- o Approve an \$8 million bond program, including \$5 million in new authorizations, for the Department of Economic Development to provide low interest

loans to flood damaged businesses.

- o Approve \$4 million in bonding for the Department of Environmental Protection for emergency repairs to existing State-owned dams damaged by the floods which needed repairs to relieve danger to people living below them, and for ongoing repairs to State-owned dams identified by the Corps of Engineers as needing work.

- o Approve a tax abatement measure allowing towns to waive up to one-third of an owner's property taxes if flood damage to the property totaled more than 10 percent of its assessed value, and permit the State to reimburse each community for 90% of the tax income lost through abatements. (70)

On June 30 the Legislature passed the flood relief package proposed by the Governor. An amendment was added requiring DEP to use a portion of the bond money allocated for dam repairs to conduct a study of dams in the State. The Governor signed the legislation July 1. The State Bond Commission approved \$34 million in bonds for special flood assistance on July 23. (18,67,71)

Special Act 83-17. In the June 1983 session, the Legislature amended PA 82-1 (Appendix F). The main changes were: removal of bond authorizations for low-interest loans for housing and businesses, because these programs had been little used; a reduction in the bond authorization for public assistance from \$20 million to \$5 million to reflect the funds actually needed; and removal of a restriction limiting funds to State and town-owned property, thereby permitting reimbursement of special districts and non-profit organizations. (71a)

ASSISTANCE TO INDIVIDUALS

As a result of the major disaster declaration, several types of Federal disaster assistance were made available to individuals affected by flooding in all eight counties in Connecticut. Under the provisions of PA 82-1, special State programs were also developed and made available, and individuals were informed of regular programs of State and Federal assistance for which they might be eligible. The following sections describe the various programs which were available to flood victims. The amount of financial assistance provided is summarized, if available.

TEMPORARY HOUSING PROGRAM

The Temporary Housing Program was made available through FEMA with 100 percent Federal funding from the President's Disaster Relief Fund. After a disaster declaration, the Governor has the option of having the Temporary Housing Program be administered by FEMA or the State. For the June 1982 floods, the Connecticut Department of Housing (DOH) administered the program.

The Temporary Housing Program provided alternate housing for an individual or family while necessary repairs were made to their primary residence. Alternate housing included hotels, motels, rentals, mobile homes, or travel trailers. Eligible applicants were requested to find their own alternate living quarters where possible. Temporary housing assistance ended once permanent housing was obtained or the damaged property was restored to a habitable condition. Flood victims had until August 13, 1982

(60 days from the time of the disaster declaration) to apply for assistance under this program.

Eligibility for temporary housing assistance was available to flood victims who required temporary housing for any of the following reasons:

- Physical damage to the dwelling that prevented the family from moving back into a safe, secure, and sanitary unit.
- Essential utilities were unavailable to the dwelling for an extended period of time.
- The dwelling was inaccessible or had to be evacuated because it was surrounded by flood waters, the only access road or bridge was washed out, or there was imminent danger to the dwelling.
- The applicant was displaced by his landlord for reasons directly related to the disaster.
- Other valid reasons existed, such as special health or other unique problems that prohibited an individual from living in a dwelling that under normal circumstances would be considered habitable.

DOH verified each applicant's need for temporary housing. The period of eligibility for temporary housing was determined based on individual needs. Permanent housing was sought as soon as possible.

The Temporary Housing Program was divided into two phases. Phase I covered the time from the disaster declaration until all applicants were provided with suitable temporary housing. Phase I ended about August 20. Phase II covered the time required to relocate all applicants in permanent housing.

The program was originally scheduled to be concluded by September 1, 1983, but because four families required temporary housing after that date, the program was extended until December 1, 1983. (29,72)

A total of 2,584 applications were received for temporary housing. Of these, 1,347 were determined to be ineligible, 409 were withdrawn, 746

were granted funds for Limited Home Repairs (see following section) and the remainder were provided with some form of temporary housing. Table 4.2 provides a breakdown of the number and types of temporary housing provided. By September 1983, FEMA had advanced \$625,000 (out of \$800,000 budgeted) to DOH for the Temporary Housing Program. (73)

TABLE 4.2: ASSISTANCE PROVIDED THROUGH TEMPORARY HOUSING PROGRAM

	TOTAL ASSISTED	COMPLETED	REMAINING
<u>FAMILIES ASSISTED</u>			
Transient Accomodations Only	26	26	
Government-Owned/Assisted	1	1	
Private Rental	33	29	4
Mobile Home/Travel Trailer			
Private Site	2	2	
Group/Cluster Site	19	18	1
TOTAL FAMILIES ASSISTED	81	76	5
<u>TYPES OF ALTERNATE HOUSING</u>			
Return to Own Home (Owner)		35	1
Purchase or Build Home (Private)		9	2
Private Rental		22	1
Government Assisted Rental		3	1
Low-Income Housing		3	
Other		4	
TOTAL		76	5

Source: "Disaster Temporary Housing Program, Phase II Scoreboard," CT Department of Housing, 9/30/83

LIMITED HOME REPAIRS

The Limited Home Repair (LHR) program was an additional temporary housing resource. Persons determined to be eligible for temporary housing assistance that owned and occupied the damaged house could elect to receive LHR funding for repair of the damaged house instead of using temporary housing.

The LHR program could be used for the following purposes:

- Elimination of health and safety hazards;
- Cleaning and fumigating;
- Repairs to electrical and/or gas systems that provide service to the kitchen, bathroom, or occupied bedroom(s);
- Repairs to the plumbing system that

TEMPORARY GROUP HOUSING

More than two dozen families in Essex and surrounding towns were left homeless after their houses were destroyed by flood waters. Unable to find sufficient vacant housing in the communities which was available for long periods, the Connecticut Department of Housing decided to develop a group housing site using mobile homes.

DOH decided to use 20 of 24 mobile homes stored at Bradley Field and listed as surplus by the State. These mobile homes were those remaining from 52 that originally had been used to house people after a tornado hit Windsor Locks in 1978.

A suitable vacant lot was located in Essex, and the owner agreed to make the site available for up to two years for use by the flood victims. On June 22, the property owner leased the land to the Town of Essex for \$1.00. The Town in turn contracted with the State DOH for use of the land. DOH agreed to pay the Town for installation of all utilities, including a sewerage system. When the site was ready, DOH moved in the 20 mobile homes. One mobile home was fitted with a ramp to allow use by a flood victim confined to a wheel chair.

On July 17 the first of 19 individuals and families moved into the mobile homes. The residents included couples with young children, elderly couples, and individuals. Over the next several months, these flood victims lived at the temporary site as they made arrangements for permanent housing. Some were able to leave in late 1982, but most remained over the winter. Several residents left in the spring and another group left in the summer of 1983. By fall only two units remained occupied. The last of the flood victims was expected to find permanent housing by the end of December 1983. Permanent housing located by the victims included rental of private units, rebuilding a home near the site of their original house, rebuilding in a different location, and moving from the area.

As the families moved out, DOH moved the vacant mobile homes to Wethersfield where they were held as state surplus property and distributed to State agencies as needed. DOH expected to remove the utilities from the site in the spring of 1984 and return the land to its original condition. (29)

provides service to the kitchen and a bathroom;

- Repairs to or replacement of water heater;
- Repairs to exterior door(s), a bathroom door, and windows;
- Minor repairs to stove and refrigerator;
- Temporary repairs to roof;
- Temporary repairs to interior floors;
- Pump and repair of septic system;
- Repairs to or replacement of water well pump; and
- Minor repairs to and cleaning of heating unit if permanent repair could not be accomplished before the season requiring heat. (72)

A total of 746 persons participated in the LHR (74). The maximum grant to any one LHR applicant was \$2,000, and a total of \$210,857 was expended through this program. Like the Temporary Housing Program, the LHR program was 100 percent Federally funded. (29,68,75)

INDIVIDUAL AND FAMILY GRANT PROGRAM

The Individual and Family Grant program (IFG) was available to individuals and families who sustained necessary expenses or serious needs for which other governmental, private agency or insurance assistance was either unavailable or inadequate. The maximum grant under the IFG program to an individual or family was \$5,000 (combined maximum of \$5,000 for IFG and LHR). Applicants were not subject to an income limitation. The IFG program was funded 75 percent by the President's Disaster Relief Fund and 25 percent by State funds. The program was administered by the Department of Income Maintenance (DIM).

The Department of Income Maintenance verified the needs of each applicant and determined if those needs were or could be met through insurance, an SBA loan or other sources. IFG applicants had to first apply for an SBA loan unless they certified that they:

- suffered only personal property damage; or
- were unemployed; or
- derived more than 50 percent of their income from Social Security Assistance or welfare payments.

Such applicants were automatically ineligible for SBA loans. If an SBA loan was approved that would meet the applicant's needs, then no IFG grant was made. Applicants living in a designated floodplain were required to purchase adequate flood insurance as a condition of the grant. (68,76)

The IFG program was intended to provide financial assistance only if flood victims could not meet their needs through other forms of assistance. However, DIM reported that many people thought they would be immediately eligible for a \$5,000 grant. This misinformation resulted in some confusion and disappointment by applicants. Despite press releases by both FEMA and the State, people continued to have misconceptions about the IFG and other individual assistance programs. (68)

The official deadline for applying for the IFG program was August 13 -- 60 days after the disaster declaration. DIM applied for and received a seven week extension to this period. Most of the applications received during the extension period were from individuals who had filed an application with SBA at the Disaster Assistance Center, but had not simultaneously filed an IFG

application. (68)

DIM received a total of 3,059 applications for the IFG program. Of these, 1,329 were approved at a total cost of \$3,053,696.74, shared 75/25 by the Federal and State governments. In addition, DIM estimated total State administrative costs of \$238,392.70. Table 4.3 provides a detailed breakdown of the IFG program. (68,75)

SBA PHYSICAL DISASTER LOANS

The Small Business Administration (SBA) issued its own disaster declaration for physical damage (# 204806). The SBA declaration covered the entire State, and provided direct loans to individuals for the refinancing, repair, rehabilitation or replacement of property damaged as a result of the floods. Homeowners could apply for SBA loans up to \$50,000 for real estate and \$10,000 for personal property, or a combined total of \$55,000.

The SBA interest rate was tied to the prevailing prime rate, and following the June 1982 floods loans were offered at 15 5/8 percent for three years to individuals able to obtain credit through commercial sources ("credit elsewhere" test). Individuals without "credit elsewhere" were offered loans at 7 7/8 percent for up to 30 years. Applicants had to satisfy SBA that they could pay back the loan, and some applications were denied because of insufficient ability to repay. SBA authorized 901 home loans for a total loan amount of \$6,219,430. (77)

CONNECTICUT HOUSING LOAN PROGRAM

The special flood relief legislation passed by the Connecticut General Assembly included \$5 million in bonds to be used by the Connecticut Department of Housing for low-interest housing loans. The loan program was established to supplement the SBA loan program. Applicants had to first apply to SBA for a loan. If denied an SBA loan, they could apply to the State program. SBA informed all applicants of the possibility of a loan from the State program.

The legislation required that interest rates on State loans not exceed one percent above the rate of interest on the last State bond issue before the loan was awarded. Regulations developed by DOH provided for a flexible loan rate below 7 5/8 percent, for up to 30 years, including the possibility of an interest free loan. Only 15 applications were received for the State loan program. No loans were granted. DOH reported that most of the applicants had very poor credit ratings and could not repay even an interest free loan. Two loan applications were pending when the \$5 million was reallocated by the Legislature in June 1983. (78)

DISASTER UNEMPLOYMENT ASSISTANCE

Disaster Unemployment Assistance was available to persons out of work as a result of the floods. The Department of Labor (DOL) administered the program in conjunction with the regular unemployment assistance program. Of 970 applications for Disaster Unemployment Assistance, 960 were determined eligible. Of these, 496 actually received some Disaster Unemployment Assistance.

TABLE 4.3: STATISTICAL REPORT ON INDIVIDUAL AND FAMILY GRANT PROGRAM

COST OF INDIVIDUAL AND FAMILY GRANT PROGRAM		
Original estimated cost of grants (Federal and State)		\$1,000,000
Actual cost of grants (Federal and State)		3,053,697
State estimate of total administrative expenses		238,393

APPLICATIONS		
Total	3,059	
Approved	1,329	
Disapproved	1,047	
Withdrawn	683	

APPEALS RECEIVED		
Total	333	
Granted in Full	26	
Granted in Part	94	
Denied	213	

GRANTS		
Number of grants	1329	
Total grant payments	\$2,847,354 ¹	
Average Grant	\$ 2,142	
Maximum Grants	169 @ \$5,000	

GRANT CATEGORIES		
Housing		
- Repair, replace, rebuild	# 826	\$1,715,984
- All others	81	328,516
Personal property		
- Household items, furnishings, appliances	586	441,809
- All others	226	65,102
Transportation	50	19,102
Medical/Dental	27	12,225
Funeral expenses	6	11,570
Flood insurance premiums	637	31,812
Minimization measures	86	170,042
Cost of estimates	72	5,326
Other	60	45,160

¹ Prior to cancellations of outstanding checks and refunds.

Source: "Final Statistical Report," State of CT, Individual and Family Grant Program, 8/23/83

The Department of Labor reported that 3,028 individual Disaster Unemployment Assistance claims were filed (one claim filed per person for each week of unemployment), and 2,250 claims were paid at a total cost of \$151,864⁸. DOL also estimated that at least an additional \$272,000 were paid in regular unemployment benefits to persons out of work due to the floods. (79)

CRISIS COUNSELING

The Connecticut Department of Mental Health (DMH) assisted flood victims through local community clinics, at the Disaster Assistance Centers, and through a special outreach program. In the areas hardest hit by flooding, community clinics extended their normal hours on the days when flooding occurred to provide any needed assistance to flood victims. DMH also provided staff at the DAC's to interview persons suffering from stress related to the flooding and to refer them to appropriate sources for additional counseling if needed. (80) (See Chapter 5 for information on additional crisis counseling several months after the flood.)

NON-DISASTER ASSISTANCE PROGRAMS

In addition to the special disaster programs, other assistance was available to flood victims through regular State and Federal programs. The Department of Income Maintenance reported that 83 persons received assistance through the **Food Stamp** program. Thirteen others received assistance from a variety of ongoing programs such as **Medicare** and **Medicaid**, **Aid to Families of Dependent Children**, **Aid to Dependent Children**

of Unemployed Parents, and the **State Supplement Program** which provides supplemental payments to disability or retirement Social Security pensions. The Connecticut **Department on Aging** interviewed 168 persons over 60 years of age and referred many of these to existing services for the elderly. (68,81)

ASSISTANCE FROM PRIVATE ORGANIZATIONS

About 55 Red Cross staff workers from Connecticut and several other states worked with about 550 volunteers to provide emergency assistance in the first few days after the flood. The Red Cross supplied more than 3,000 meals, operated 25 shelters in 21 towns that housed 648 people, and handed out 2,850 clean-up kits containing mops, brooms and disinfectant. The Red Cross also operated an Unmet Needs program that assisted flood victims whose needs could not be met through any State or Federal program, either disaster programs or regular programs. Approximately \$475,000 was provided to flood victims through this program. (30,31)

Throughout the areas hardest hit by flooding, community and church groups raised funds to assist needy flood victims. In Clinton, a Flood Relief Committee raised more than \$36,000 to aid 17 Clinton flood victims. The Committee received donations from civic groups, individuals, and local businesses. In Essex, the Essex Foundation received donations of at least \$90,000 from all over the State for distribution to Essex's flood victims. Five members of the Mennonite church in Pennsylvania traveled to Essex and spent about a week assisting families and businesses clean up their flood damaged buildings. (18)

ASSISTANCE TO BUSINESSES AND AGRICULTURE

Commercial, industrial and agricultural concerns that suffered flood damages had limited sources of assistance available to them. There were no grant programs; insurance and loans were the two forms of financial aid available.

SBA LOANS

Physical Disaster Loans. SBA provided Physical Disaster Loans directly to businesses as well as individuals. These loans could be used to replace or repair damaged real estate, inventory or other business property. Businesses were required to document their flood damages and have the damages verified by an SBA representative. They also had to demonstrate an ability to repay the loan. Businesses that could obtain credit through commercial sources ("credit elsewhere" test) were offered SBA loans at 16 percent for three years. Those unable to obtain credit elsewhere were offered SBA loans at 8 percent for up to 30 years. The SBA loans were for 85 percent of verified losses up to a maximum loan amount of \$500,000.

A total of 253 SBA Physical Disaster Loans to businesses were authorized at a total amount of \$10,255,900. Several loans for the maximum \$500,000 were made. (77)

Economic Injury Disaster Loans. SBA also made available Economic Injury Disaster Loans (EIDL) under a separate disaster declaration (# 597800). These loans were available to businesses who suffered economic injury as a direct result of the disaster (with or without

physical damage) and did not have credit elsewhere. SBA made 9 EIDL loans totaling \$158,000. (77)

BUSINESS EMERGENCY RELIEF PROGRAM

The Connecticut flood relief legislation created a loan program for businesses as well as individuals. The legislation provided \$8 million that could be used for loans to businesses and agricultural concerns. The loans could be used for repair, reclamation, or replacement of: machinery; equipment; real property and improvements thereon; inventory; and crops.

The maximum loan was \$500,000 for a term of ten years. The interest rate could be no more than 1 percent above the rate of interest on the last State bond issue prior to the date of the loan closing. Businesses had one year from the date of the emergency declaration by the Governor (June 7, 1982) to apply for loans, and had to demonstrate insufficient assistance from Federal programs. The Connecticut Development Authority (CDA), part of the Department of Economic Development, operated the loan program.

All businesses that applied for an SBA loan were eligible to apply for the State loan program. Those that were denied an SBA loan could apply to the State for the full amount of their verified losses. Those that received an SBA loan could apply to the State for the remaining 15 percent of their verified losses. Even though each business that applied for an SBA loan was notified by SBA that additional assistance might be available from the State through this loan program, CDA received only 29 applications.

CDA used the applicant's SBA loan application and the SBA loss verification for most of its information, and applied criteria similar to those used by SBA in determining loan eligibility. Most of the 29 applications were rejected by CDA for various reasons: applicant could not prove losses; refusal to guarantee loan by owners; ineligible non-profit organization; refusal to provide sufficient financial information; and refusal to pay closing costs (approved loans required payment of a \$150 to \$200 fee to cover preparation of legal documents).

Table 4.4 shows the status of the Business Emergency Relief Program as of August 1, 1983. Of the eight loans that were approved, about half had received 85 percent loans from SBA, and the remainder had been rejected by SBA. Most of the approved loans were for very small amounts, and ranged from \$1,300 to \$175,000. Interest rates charged ranged from 10.1 percent to 9.3 percent. CDA stated that it did not expect all of the approved loans to proceed to a closing. All loans were to businesses; there were no applications from agricultural concerns. (82)

TECHNICAL ASSISTANCE

During the weeks following the floods, the Department of Economic Development (DED) assisted businesses most severely affected by the floods return to operation. Working through its central office in Hartford and several regional offices, DED helped businesses find temporary or permanent new business sites; locate needed warehouse space or storage trucks and trailers; and assist them with setting up operations in new locations. DED representatives

also made follow-up visits to many flood damaged businesses to determine if they were recovering from the flood, to make them aware of the SBA and State loan programs, and to see if DED could provide any form of assistance. (28) (See Chapter 5 for information on additional technical assistance from DED).

TABLE 4.4: CONNECTICUT BUSINESS EMERGENCY RELIEF PROGRAM

Total Applications	29	\$549,902
Withdrawn/ Ineligible	8	112,300
Declined	9	191,352
Approved	8	196,000
Pending	4	50,250
TOTAL	29	\$549,902
Closed	3	\$ 12,600

Source: Connecticut Development Authority, 8/1/83

FEDERAL CROP INSURANCE

Although the floods caused damage to several crops in Connecticut, only corn was covered under the Federal Crop Insurance program, and only about ten percent of the total acreage in corn was covered by crop insurance. Loss payments under the crop insurance program were made after the harvest by comparing the actual yield to the expected yield. A total of \$56,938, on 63 policies, covering 2,761 insured acres was paid for a reduction in corn crops in 1982. Payments were made to farmers in all eight counties, distributed as follows. (83)

Fairfield (1)	\$ 133
Hartford (21)	15,452
Litchfield (16)	15,179
Middlesex (9)	6,353
New Haven (2)	3,126
New London (5)	2,415
Tolland (3)	11,336
Windham (6)	2,944

TOTAL	\$56,938

ASCS EMERGENCY CONSERVATION PROGRAM

The Federal Agricultural Stabilization and Conservation Service (ASCS) administers an Emergency Conservation Program that provides partial reimbursement to farmers for damages to cropland. Funds may be used for removing debris and restoring fields and seriously eroded areas.

Immediately after the flood, ASCS in Hartford authorized \$200,000 for the Emergency Conservation Program, available to farmers throughout Connecticut. Only about half of the money was cost-shared with farmers. Under program

guidelines, farmers with qualifying damages paid the initial 20% of costs. ASCS paid up to 80% of the remaining costs; leaving the farmer with a net payment of 36% of total costs and ASCS with 64% of total costs.

A total of 118 farmers from all eight counties applied for the program. Seventy-six applications were approved by ASCS County Committees, and a total of \$87,198 was paid. Some of the conservation work was done immediately after the flood, while other work was delayed until the spring or summer of 1983 because of wet fields and tillage and cropping practices.

The distribution of payments by county was as follows:

Fairfield (3)	\$ 1,735
Hartford (10)	8,689
Litchfield (6)	12,889
Middlesex (6)	5,734
New Haven (19)	37,382
New London (5)	3,782
Tolland (18)	12,803
Windham (9)	7,966

TOTAL	\$87,198

Approximately \$10,000 of the available funds were paid by ASCS to the Soil Conservation Service for technical assistance for designing and supervising restoration of conservation structures on the farms. (84)

ASSISTANCE TO INDIVIDUALS AND BUSINESSES

FLOOD INSURANCE

National Flood Insurance Program. Flood insurance through private insurance companies is generally unavailable to homeowners and is available to businesses on only a limited basis. Most flood insurance is provided by the National Flood Insurance Program (NFIP), administered by the Federal Insurance Administration (FIA) within FEMA.

In June 1982 all Connecticut towns except Salem were participating in the NFIP, making almost all floodplain residents eligible for flood insurance. Approximately 13,300 NFIP flood insurance policies were in force in Connecticut with about \$700 million of insurance coverage (85). The DEP Natural Resources Center estimated that about 40,000 structures are located in designated floodplains in Connecticut (86).

FIA paid 1,518 claims on flood insurance policies with a total value of \$12,015,458⁹ (87). Since the Department of Housing estimated that more than 15,000 residences suffered at least minor flood damages and the Department of Economic Development identified over 400 businesses with flood damages, the small number of claims paid indicates that most of the flooded buildings were not covered by flood insurance.

Six months after the June floods, all towns were participating in the NFIP¹⁰, and the number of flood insurance policies in Connecticut had increased to 14,774 with \$779,296,500 in force (December 31, 1982). One year later on June 30, 1983, there were 15,433

policies in force with \$835,395,600 in insurance (85). Individuals and businesses who received Federal assistance through the Individual and Family Grant Program and SBA loans were required to purchase and maintain flood insurance as a condition of receiving the loans or grants. (68,77)

The storm system that produced the June 1982 flooding did not generate strong winds, so most damage was caused by flooding, flood-caused erosion and saturated soil conditions that would have been covered by flood insurance. Some losses did result from wind, leaky roofs, and other non-flood, storm related damages, including damages to automobiles which are not covered under NFIP policies.

The Department of Economic Development estimated that only about five percent of businesses affected by the flood were covered by flood insurance (28). Some businesses had private insurance in addition to or instead of NFIP insurance. Some large companies, particularly those with facilities in many different locations, obtain all of their flood insurance through private insurance companies. More typically, the NFIP is used to provide insurance up to the limits available under that program, and private insurance is obtained for additional coverage. The NFIP serves as a deductible for the private insurance.

Private Insurance. Private insurance companies provide estimates of insured damages for all catastrophies where insured damages are in excess of \$5 million. For the June 1982 storm in Connecticut, Massachusetts and Rhode Island, the estimated losses for insured property (excluding NFIP coverage) was \$15 million. No separate breakdown for Connecticut was available. (89)

TAX ABATEMENTS

The flood relief legislation enacted after the June floods included a provision for tax abatements for persons whose property was damaged more than 10 percent of its value by the floods. Towns were authorized to abate up to one-third of the taxes due, and the State would reimburse the towns for 90% of the taxes lost. Eighteen towns offered some tax abatement to property owners, and the State reimbursed these towns a total of \$49,504.55 (90). Table 4.5 lists the amount reimbursed to each town.

IRS CASUALTY LOSSES

At the time of the June floods, Federal tax codes permitted individuals to itemize deductions for casualty losses not covered by insurance or other means, subject to a \$100 deductible¹¹. Businesses could also claim a casualty loss, but were not subject to a deductible. No information was available on the amount of flood losses claimed as casualty losses. The Internal Revenue Service representatives at Disaster Assistance Centers provided information on casualty loss deductions to most of the persons who visited the centers, including procedures for claiming casualty losses on an amended 1981 return. (18,91,92)

**TABLE 4.5: STATE REIMBURSEMENT
OF TAXES TO TOWNS THAT GRANTED
TAX ABATEMENTS**

MUNICIPALITY	AMOUNT
Town of Cheshire	\$ 446.46
Town of Chester	115.78
Town of Clinton	613.76
City of Derby	49.16
Town of East Haven	355.19
Town of East Lyme	182.87
Town of Essex	5,013.65
Town of Mansfield	479.73
City of Meriden	1,890.69
City of Milford	2,051.09
City of New Haven	34,714.35
Town of Old Lyme	352.73
Town of Old Saybrook	115.68
Town of Orange	110.11
Town of Prospect	56.16
Town of Seymour	32.20
Town of Southington	710.78
Town of Wallingford	2,214.16
TOTAL	\$49,504.55

Source: CT Office of Policy and
Management

ASSISTANCE TO MUNICIPALITIES

Financial assistance to repair or replace town facilities damaged by the floods came primarily from three sources: Public Assistance Program under the President's Disaster Relief Fund, administered by FEMA; Emergency Relief Program for municipal roads and bridges funded through the Federal-Aid Highway Program, administered by the Federal Highway Administration (FHWA); and State bond funds authorized by the Connecticut Legislature.

SOUTHERN COUNTIES

FEMA Public Assistance Program. The major disaster declaration for Connecticut covered only the four southern counties for Public Assistance. The Public Assistance program is designed to provide 75 percent of the cost of replacing or repairing damaged public facilities to their pre-disaster condition, and certain other flood-related expenses. State and local governments must provide the remaining 25 percent. Any improvements to the facilities beyond their pre-flood condition generally must be paid for by the State or local government.

The Public Assistance program was coordinated by FEMA and OPM for three months from the Disaster Field Office in Middletown. After the DFO closed, FEMA and OPM operated from OPM offices in Hartford. Several OPM staff were assigned full-time to the disaster assistance program to provide the local coordination with FEMA and to manage the approval of State funds. This effort involved assisting with the preparation

of original and supplemental applications, processing requests for changes and extensions of Damage Survey Reports (DSR), checking all paperwork before submission to FEMA, and coordination of final inspections and audits.

To inform municipal officials of the procedures for applying for federal assistance, FEMA held a series of applicant's briefings shortly after the disaster declaration on June 14. The first step in the process was the filing by towns of a Notice of Interest in receiving federal assistance. The Notice of Interest provided information on the types of assistance needed. Financial assistance for disaster related expenses was divided into nine categories: debris clearance; protective measures; road systems; water control facilities; public buildings and equipment; public utility systems; facilities under construction; private non-profit facilities; and other categories not included above. The Notice of Interest Forms helped FEMA determine how many and what types of Damage Survey Teams would be required to verify the damages.

Several Damage Survey Teams, consisting of Federal and State representatives, were assigned to prepare Damage Survey Reports for each damaged public facility for which municipalities were seeking assistance. Representatives from the Corps of Engineers, Federal Highway Administration, and Environmental Protection Agency worked with State representatives from the Department of Environmental Protection, Department of Administrative Services and Department of Transportation to prepare the Damage Survey Reports. Teams were also accompanied by a local representative in each town. The DSR's were prepared based on an on-site inspection by the team and on information provided to the team by local officials.

After the DSR's were prepared, municipalities prepared a Project Application form as a formal request for aid. Project Applications combined several DSR's for similar types of damages. The deadline for Project Applications was 90 days after the disaster declaration. The total amount of losses determined eligible by FEMA and OPM in the four southern counties (including special districts and nonprofit organizations) as of December 1983 was \$10,471,404. The State had reimbursed the towns \$2,617,007 and FEMA had reimbursed \$6,022,400 for a total of \$8,639,407. FEMA withholds 25 percent of its total reimbursement until final inspections and audits have been performed (except for Small Project Grants under \$25,000), and an additional \$1,794,847 remained to be reimbursed by FEMA. An additional \$248,177 in applications were pending approval by FEMA (already approved by OPM) in December 1983. (17,40) The amount of funds approved and paid to each town is shown in Appendix D.

Four types of grants were available under the FEMA programs: categorical grant, grant-in-lieu, flexible funding grant, and small project grant.

Categorical grant. Reimbursement was limited to the actual cost of performing work approved by FEMA. It could not exceed the net eligible cost of restoring a facility, based on the pre-disaster design of the facility and on current applicable standards.

Grant-in-lieu. If an applicant desired to construct a larger or more elaborate facility, it could apply for a grant-in-lieu equal to the amount approved by FEMA for repair or replacement of the damaged facility. The replacement facility could be of a design, size or type, or composed of materials signifi-

cantly different from those of the eligible damaged facility.

Flexible funding grant. If the estimated cost of permanently repairing, restoring, reconstructing, or replacing all of its damaged public facilities exceeded \$25,000, an applicant could elect to receive a grant equal to 90 percent of the Federal estimate of the permanent work instead of a categorical grant. This permitted flexibility in the use of the Federal grant, and the applicant could choose not to restore the damaged facilities, but to build new public facilities for other purposes necessary to meet its needs for governmental services and functions.

Small project grant. If the FEMA estimate of eligible costs for restoration of damaged or destroyed facilities and debris removal and emergency protective work totaled less than \$25,000, the applicant could receive a small project grant. A portion of the funds could be used to construct facilities needed to meet the community's needs for public services and governmental functions, if the alternate projects were approved by FEMA prior to the start of design or construction. (93)

Not all requests for reimbursement were approved by FEMA. Differences between the amount towns requested and FEMA approved resulted from several causes. Frequently there were disagreements as to how much of the required work was actually flood related. For example, a bridge or roadway may have been in need of repairs before the flood. If flood caused damages could be distinguished from repair needs existing before the flood, FEMA would approve only those directly caused by the flood. A common discrepancy in the cost estimates for roadway repair concerned the thickness

MILFORD RECORDS SALVAGED

After the basement offices at the Milford City Hall were flooded on Saturday night, City officials -- at an emergency meeting Sunday morning -- decided to freeze the most important town records in hopes that they could be saved. An empty freezer in town was located, and as soon as the water was low enough to allow people into the basement, the water-soaked records were placed in plastic bags and transported to the freezer. By the end of Sunday, essentially all the documents had been stacked 6-8 feet high in a 50-foot freezer.

The documents remained in the freezer for over two months while officials searched for someone qualified to handle them. After about two months a contract was

signed with American Freeze-Dry, Inc. of Audubon, N.J. The company transported the documents in a refrigerated truck to their facilities in N.J. There they were separated, rinsed in clear water to remove mud and silt, weighed, placed in a vacuum chamber and frozen to -20 fahrenheit. Water was removed from the documents by sublimation of ice crystals and vacuum withdrawal of moisture. Documents were periodically taken out and weighed to determine if all of the moisture was removed.

The first documents were returned to Milford about the middle of November, and the remainder by the end of January 1983. Essentially all the documents were saved with no permanent damage. (42)



Tax records and other documents from the Milford City Hall
(Photo by Bob Coleman, the Milford Citizen)

of pavement needed. FEMA generally allowed reimbursement for only two inches of pavement unless a pre-existing local road ordinance required a greater thickness. Some towns preferred repaving to a depth greater than two inches, especially where a greater depth was needed to match the level of undamaged portions of the road.

In other cases, towns wished to improve facilities when they were repaired or replaced. FEMA policies permitted only funding repair or replacement to the pre-flood condition, and did not approve funding of a "betterment". The requirement prohibiting an improvement to a facility affected the repair and replacement of some bridges. FEMA policy permitted replacing bridges with an improved flood flow capacity if the town had a higher design standard in effect. Some Connecticut towns either did not have a higher design standard in effect or were unable to document such a standard to FEMA's satisfaction, and were denied requests for reimbursement of design improvements on replacement bridges. (17)

Nevertheless, in most cases, town bridges that had to be replaced were rebuilt to a 100-year flood standard with financial assistance from FEMA. Often the towns had their own standard in place or could demonstrate a bridge replacement policy tied to the State standards (see section on State assistance later in this chapter). In other cases, the towns received a grant-in-lieu payment from FEMA which permitted them to reconstruct the bridge to a higher design standard if the town assumed the extra costs. Since most destroyed bridges were relatively small and replaced with box culverts, the increased expense for a higher design standard was not excessive. (17,94) Not all towns elected

DISPOSAL OF ESSEX'S FLOOD DEBRIS

Twenty-five destroyed houses, a million board feet of lumber from the Pratt-Reed Company, uprooted trees and chunks of asphalt from damaged roads presented a major waste disposal problem for the Town of Essex. The town landfill could not accommodate the large volume of material and alternative disposal sites were needed.

On the Monday after the flood, DEP's Solid Waste Management Unit began contacting nearby towns to find one with sufficient landfill space. The Town of Deep River agreed to let Essex use its bulky waste site, but the inconvenience to flood victims and the expense of transporting the large volume of material to Deep River indicated the need for another alternative.

DEP worked with the Essex town engineer to determine if there were ways to dispose of the waste in Essex. After consulting with the DEP Air Compliance Unit, a decision was made to burn the bulk of the flammable material, and dispose of the remaining waste at the existing Essex landfill. A section of the landfill was regraded and additional fill added so that material could be deposited and burned without causing buried material to catch fire. A new disposal area adjacent to the landfill was prepared to handle bulky, nonflammable material.

Because of the emergency situation, permits were granted by DEP and the Town to allow open-air burning and disposal of flood debris. About four months were required for all of the debris to be removed from public and private property and burned or disposed of at the Essex landfill. (94a)



Bridge over the Boston Post Road (U.S. Rt. 1) at Golden Spur in East Lyme. The top photo was taken just after the storm, and the bottom photo was taken one year later. (Top photo by John Ligos, The Day; bottom photo by Gordon Alexander, The Day)

to replace destroyed bridges to the 100-year flood design level. For example, North Stonington rebuilt to a 50-year standard (18).

Madison was the only town to use the Flexible Funding Grant. FEMA approved a Flexible Funding Grant request for \$27,252 (90 percent of \$30,281 eligible costs) covering eligible damages to roads and bridges. Madison elected not to replace a destroyed bridge, and used the funds for construction of a needed storm drain, as well as other road, bridge and culvert repairs. (17,40,95)

State Bond Funds. Public Act 82-1 authorized the State of Connecticut to provide the full 25 percent match of Federal disaster assistance funds. Local municipalities did not have to provide any funds toward repairs eligible under the Federal Public Assistance program. They did have to pay the costs of needed repairs which were not eligible under the FEMA guidelines, any improvements beyond a return to pre-flood conditions, and administrative costs.

Connecticut was the first state to provide the full 25 percent matching funds since 75/25 cost sharing was required by FEMA in May 1980 (86,96). Other states had shared the 25 percent costs with local jurisdictions, usually 12 1/2 percent each. Had Connecticut followed a similar policy, local governments would have incurred much higher costs. Almost all towns with substantial losses would have needed to issue bonds in order to pay their share of the costs. Even with State and Federal funding assistance, many towns issued bonds to pay the initial construction costs. Towns with less substantial losses were able to pay recovery costs out of their operating budget or deferred the largest

repair and reconstruction expenses until funds were received from FEMA (less 25 percent) and the State.

Whenever FEMA and an applicant town disagreed over the amount of eligible costs, OPM attempted to mediate the dispute and work with the town in providing adequate documentation to support their application. When FEMA did not approve the entire amount applied for, State funds were supplied to provide 25 percent of the eligible amount. Towns had to pay any remaining costs from their own sources. (17)

Federal Highway Administration Funds. Towns in the four southern counties were also eligible for financial assistance from the Federal Highway Administration (FHWA) for all town roads constructed with funds from the Federal-Aid Highway System. FHWA provided 100 percent funding for repair or replacement of roads and bridges included in this program. Bridges that had to be replaced were upgraded to meet current Federal and State standards.

FHWA and the State Department of Transportation (DOT) were responsible for this program -- FEMA and OPM were not involved. The process for documenting damages was similar to that used by FEMA. Damage Survey Reports were prepared for each bridge or segment of highway that was damaged. Damage Survey Teams were composed of representatives from FHWA, the State DOT, and local municipalities.

One hundred and sixty-one town road segments and bridges were restored under this program at a cost of \$1,173,378, including temporary and permanent repairs. (19,41) These costs were divided among the counties as follows:

Middlesex	\$ 73,664
Fairfield	64,390
New Haven	908,233
New London	127,091

TOTAL	\$1,173,378

NORTHERN COUNTIES

No Federal financial assistance was available to the State or municipalities for damages to public facilities in the four northern counties. As part of the flood relief legislation, the Legislature provided that State bond monies could be used to provide the same percentage share of funding to towns in the northern counties as it was providing for towns in the southern counties, i.e. 25 percent of eligible flood losses. This provision was questioned by some town officials and State representatives from the northern counties who felt that the intent of the legislation (especially the June 1983 amendments) was for the State to provide an equivalent dollar amount instead of an equivalent share. A legal opinion requested by OPM supported the procedures established by OPM of providing northern towns with 25 percent of their eligible costs. (17,97,98)

OPM operated the State assistance program for the northern counties and modeled it on the FEMA program. The same documentation and application procedures were used, and the FEMA forms were modified to become OPM forms. Damage Survey Teams composed of State and local representatives prepared the DSR's.

The initial experience gained by OPM in assisting FEMA with operation of the Federal program allowed the State

program for the northern counties to function without any additional problems. As of December 1983, a total of 33 towns, two special districts, and two non-profit organizations from the four northern counties had received State assistance. A total of \$1,636,752 in eligible losses was approved by OPM for a total payment in State aid of \$409,191. (40) The amount approved and paid to each applicant is shown in Appendix D.

STATE AGENCIES

In addition to the financial assistance provided to municipalities, several State agencies received reimbursement from FEMA, FHWA, and State bond funds for damages to State owned facilities or for emergency actions performed during and immediately after the floods.

FEMA AND STATE PUBLIC ASSISTANCE

As of December 1983, a total of \$2,417,169 had been approved by FEMA and OPM for losses experienced by eight State agencies at locations in the southern counties. Payments to State agencies totaled \$1,174,349: \$954,488 from FEMA, and \$219,861 from OPM. OPM had also approved \$361,006 in applications by DEP, DOT, and the University of Connecticut for losses at locations in the northern counties. OPM had paid \$90,207 to these agencies as of December 1983. (40) The amount paid to each agency is shown in Appendix D.

Unlike some towns, the Department of Transportation experienced no difficulties in receiving approval from FEMA to repair or replace destroyed bridges to a higher hydrologic standard. DOT had clearly established standards in its design manuals that provided for bridges over a waterway with a drainage area greater than one square mile to pass a 100-year flood (94).

FEDERAL HIGHWAY ADMINISTRATION

The Federal Highway Administration also provided funding assistance for State roads and bridges in the four southern counties that are part of the Federal Aid System. Reimbursement of repair or replacement costs were funded 100 percent by FHWA, including replacement of bridges with an improved hydrological standard where needed.

One hundred and sixty-four road segments and 39 bridges were eligible for FHWA assistance. Costs as of December 1983 for temporary and permanent repairs were \$7,715,367 for bridges and \$2,142,529 for roads, for a total cost of \$9,857,896 (41). The breakdown by county is:

<u>County</u>	<u>Bridges</u>	<u>Roads</u>
Middlesex	\$3,689,221	1,124,614
New Haven	776,161	482,699
New London	3,189,985	396,232
Fairfield	0	138,984
<hr/>		
TOTAL	\$7,715,367	\$2,142,529

STREAM IMPROVEMENTS

Immediately after the flood, the Soil Conservation Service undertook several emergency watershed protection projects under its exigency program. These projects were funded 100% by the SCS at a total cost of \$2,655,229 (see Chapter 2). Several non-exigency projects were also funded by SCS. Non-exigency projects were funded 80 percent by SCS and 20 percent by a local sponsor. The Connecticut DEP served as the local sponsor for all non-exigency projects in Connecticut.

Eighty sites were investigated by SCS for possible treatment under the non-exigency program, and twenty-five sites were selected by SCS and DEP for treatment. Only 20 sites were ultimately included in the program, with work at the remaining five sites funded by the FEMA Public Assistance Program or directly by the town. The last of the projects was completed in August 1983. Total cost of the projects was \$800,083.60. The SCS paid 80 percent (\$640,066.88) and DEP paid 20 percent (\$160,016.72). A summary description of the projects is provided in Table 4.6 and the location of the projects is shown in Figure 4.7. (35)

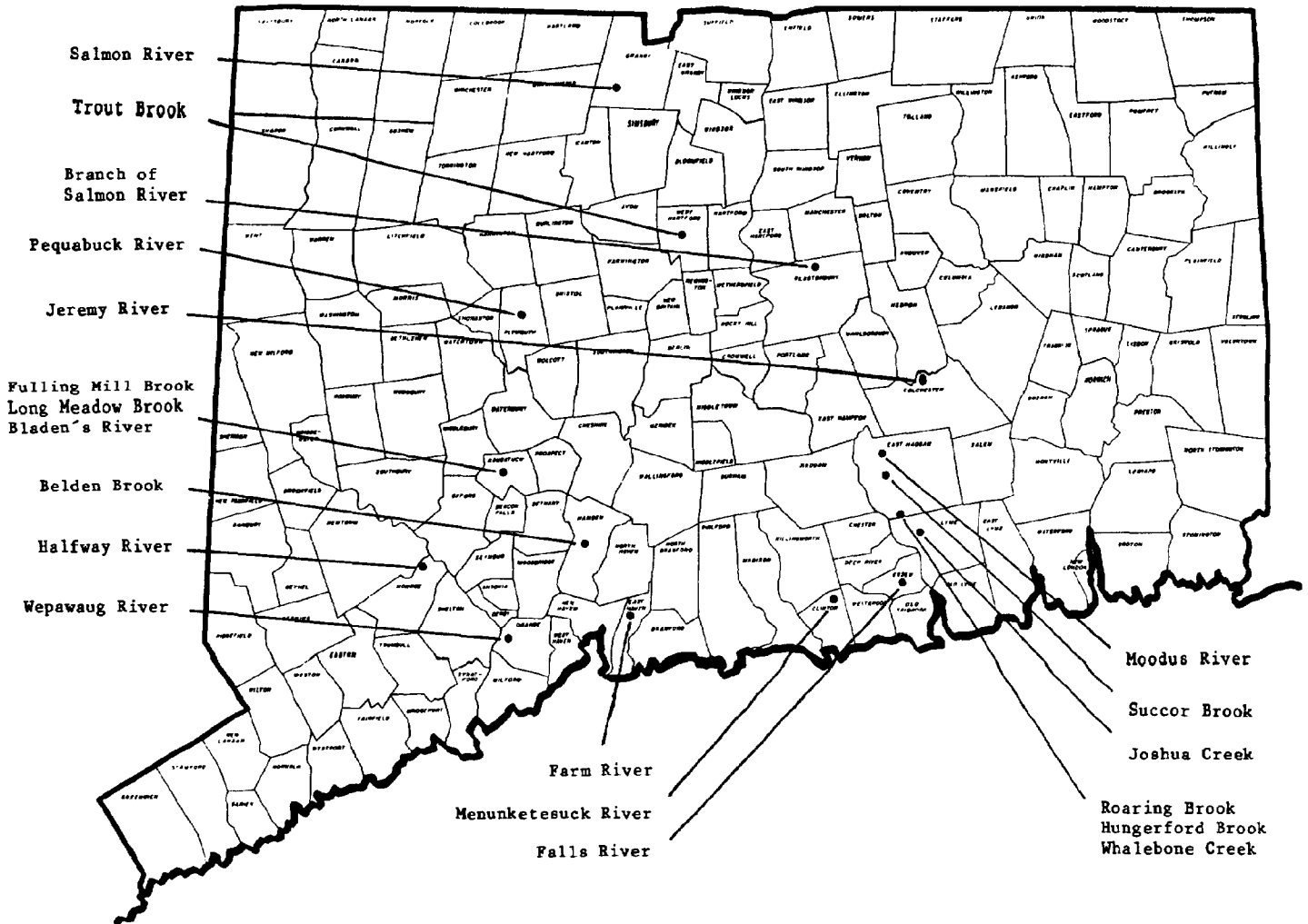
TABLE 4.6: SCS NON-EXIGENCY PROJECTS

PROJECT NAME	LOCATION	MEASURE	TOTAL COST
Fulling Mill Brook Long Meadow Brook Bladen's River	Naugatuck	OR,SBS,S	\$322,972
Belden Brook	Hamden	OR,SBS,S	20,825
Halfway River	Monroe	SBS,S	40,974
Farm River	E. Haven	OR,SBS,S	16,284
Salmon River	Granby	OR,SBS,S	7,470
Branch of Salmon River	Glastonbury	OR,SBS,S	12,944
Roaring Brook Hungerford Brook Whalebone Creek	Lyme/E. Haddam	OR,SBS,S	43,950
Succor Brook	E. Haddam	OR,SBS,S	13,975
Moodus River	E. Haddam	OR,SBS,S	22,698
Wepawaug River	Orange	OR,S	7,641
Trout Brook	W. Hartford	SBS,S	53,271
Falls River	Essex	OR,SBS,S	15,156
Joshua Creek	Lyme	OR,SBS,S	21,219
Jeremy River	Colchester	OR,SBS,S	41,846
Pequabuck River	Plymouth	OR,SBS,S	94,275
Menunketesuck River	Clinton	SBS	64,584
TOTAL			\$800,084
		SCS Share - 80%	\$640,067
		State Share - 20%	160,017
		TOTAL	\$800,084

OR - Obstruction Removal; SBS- Stream Bank Stabilization; S- Seeding

Source: Soil Conservation Service, Storrs, CT

FIGURE 4.2: LOCATION OF SCS NON-EXIGENCY PROJECTS



Source: Soil Conservation Service, Storrs, CT



*Channel restoration by the Soil Conservation Service on the Falls River, Essex
(Photos courtesy of the U.S. Soil Conservation Service, Storrs, CT, and Haddam,
CT)*

CHAPTER 5

POST-FLOOD PROJECTS AND INVESTIGATIONS

Could Save Lives, Property

New Flood-Warning System Backed

By STEVE GRANT
Courant Staff Writer

A computerized flood-warning system that the state is being asked to fund could have prevented millions of dollars in property damage last June — and paid for itself in a matter of hours — a federal hydrologist said Wednesday.

During that storm, the National Weather Service measured 8 inches of rain in much of the state and forecast heavy flooding. What forecasters didn't know, and wouldn't find out until the next day, was that the Essex area got almost twice as much rain as other areas, causing millions of dollars in flood damage.

"Nobody understood the gravity of the situation," said David C. Curtis, a flash-flood hydrologist with the Northeast River Forecast Center in Bloomfield, the weather service's sister agency.

Flood damage in Connecticut averages \$50 million yearly, he said.

A new system being promoted by the weather service would continuously monitor rainfall, its intensity and the levels of streams and automatically report the information to a computer network.

The General Assembly is considering a bill that would authorize bonding for a \$210,000 pilot project that would install the warning system in rivers in Hartford, Stamford, Norwich, Southington, Essex and New Milford. The proposal has cleared the Environment Committee and likely will be considered next week by the Finance, Revenue and Bonding Committee's bonding subcommittee.

"I'd give it a reasonable chance. Any time we can spend a dollar and save 10, I'm in favor," said Rep. Michael D. Ryback, a Harwinton Democrat who is House co-chairman of the subcommittee.

The six communities together would pay another \$120,000 to implement the project. The federal government would provide computer programs, expertise and training.

The system, Curtis said, provides civil preparedness officials with speedier notice of potential flooding, the key to timely evacua-

tion of people and movable property. Authorities now rely on a network of volunteers around the state to supply information on rainfall and stream flows.

The new system, called ALERT — for Automated Local Evaluation in Real Time — would comprise small sampling stations within river watersheds. Some would monitor river depth, and others would measure rainfall. Information would be radioed to the communities and a central state facility. Unusually heavy rain could be spotted and the area watched closely.

The rainfall monitors are 12-foot high

tubes, 12 inches in diameter, with rain collectors and radio transmitters. The depth indicators are floats that check river depth. Setting up 150 rainfall and stream monitors statewide would cost about \$1 million, Curtis said.

His agency estimates that there is a nearly one in five chance that in some year before the turn of the century, flood damage in Connecticut will exceed \$500,000.

"This won't prevent a house from being washed away," Curtis said. "But 10 percent to 35 percent of the damages in a flood are preventable."

Report: state action sought to repair 488 unsafe dams

HARTFORD (AP) — Nine months after Connecticut was devastated by the worst flooding in 27 years, the state remains dotted with unsafe dams and its dam safety program is criticized in a new report as "understaffed, overworked and inadequately funded."

"If you don't have the immediate public attention on it, it's easy for people to forget, but we've still got a serious problem," said Benjamin Waraer, director of the Department of Environmental Protection's water resources division.

Consulting engineers who studied the state's dams concluded that the state has never imposed existing legal penalties for failure to comply with dam repair orders and has failed to operate a program of regularly scheduled dam inspections.

The rainstorm of June 4-7, which dumped 10 to 12 inches of rain on the state, killed 12 people and caused damage that state government estimated at \$277

been listed as unsafe and in need of immediate repairs in a 1978 inspection by the Army Corps of Engineers. They had not been fixed.

The 44 remaining dams listed as hazardous were checked after the storm and found to have survived without further critical deterioration.

The worst dam collapse occurred at an earthen dam in Essex. Its failure triggered the collapse of six more dams downstream on the Falls River. Five homes were destroyed and a factory and roads heavily damaged. Losses in Essex were estimated at about \$4 million.

"This same type of destruction could occur at any time throughout Connecticut" during heavy rains, said John W. Anderson, the DEP's deputy commissioner.

The Legislature met in special session in June, authorizing \$34 million in borrowing to pay for flood cleanup, road and bridge repairs and some work on dams. It also ordered a

- Expand the DEP dam safety staff from four to 20 at a cost of about \$200,000 per year.

- Establish a special dedicated fund for dam repairs, for which the DEP is proposing \$3 million this year.

- Require registration of all dams not owned by the state, with annual fees expected to produce about \$75,000 per year.

- Set up a low-interest loan program to help dam owners make repairs.

- Increase state aid to cities and towns under the flood and erosion control program to provide money for repairs of municipally owned dams that provide a "substantial public benefit."

- Give the DEP full authority over all dam repair projects by ending the Department of Administrative Services' role in projects costing \$100,000 or more.

The study, issued Feb. 28, criticized the state for "attempting to accomplish

long, 33 feet high and a century old — is among Connecticut dams most in need of repair, but town officials, facing budget problems, have held off on the \$300,000 project. The dam and pond are part of a town recreation area.

The Manchester case is typical, not unusual, Warner said Wednesday.

The preceeding chapters described the immediate post-flood emergency relief and recovery actions. The June 1982 flooding was of such magnitude and caused so much damage that it generated a number of special studies and projects relating to long-range flood control projects, floodplain management, and hazard mitigation actions. This chapter briefly describes these special investigations and projects.

HAZARD MITIGATION REPORTS

The declaration of Connecticut as a major disaster area triggered FEMA requirements for two types of hazard mitigation studies. First, an Interagency Flood Hazard Mitigation Team was activated to investigate and prepare a report within 15 days of the disaster declaration regarding measures that could be taken -- especially by Federal agencies -- to reduce future flood losses. A follow-up report was prepared 90 days later describing progress and problems in implementing the recommendations contained in the first report. Second, under FEMA regulations and as part of the Federal/State Agreement for disaster assistance, the State was required to prepare its own Hazard Mitigation Report.

INTERAGENCY FLOOD HAZARD MITIGATION REPORT

Following every flood that receives a major disaster declaration, representatives from as many as 12 Federal agencies work with affected State and local governments to identify measures that can be taken to reduce future flood losses. Although concerned with all types of

hazard mitigation measures, the interagency team focuses on actions that can be taken by Federal agencies. The team is required to produce a report within 15 days of the disaster declaration. The interagency team that evaluated the Connecticut flood disaster was composed of representatives from FEMA, EPA, HUD, SBA, COE, ASCS, NWS, and FHWA. The Connecticut DEP, Water Resources Unit, participated on the team, and representatives from individual towns were also involved.

Fifteen-Day Report. The team members assembled at the Disaster Field Office in Middletown on June 17. They divided into field teams and over the next two days conducted site visits in thirty towns in southern Connecticut. The entire team reassembled at the DFO and determined that there was potential for hazard mitigation measures in 17 of the towns they had visited.

Team members then revisited each of the 17 towns and met with local officials to discuss the nature and types of damages and potential for flood hazard mitigation. These meetings resulted in the development of mitigation recommendations for 13 towns -- eight of the towns received specific recommendations and 5 others were included in several general recommendations. The report was completed by the team and submitted to the FEMA regional director in Boston on June 29, 1982. Copies of the report were also submitted to each of the involved Federal and State agencies and to the towns included in the report. (99)

Examples of specific recommendations made by the interagency team include:

Hamden. Implement a storm water management program to avoid an increase in recurrent flooding at the Meadowbrook Co-op.

Milford. Relocate offices and records out of the City Hall basement.

New Haven. Reevaluate the five element project plan for the Morris Cove-Airport area to fully relocate Morris Creek.

Wallingford. Acquire and relocate the Gopian Mobile Home Park situated within the State Stream Channel encroachment lines.

Cheshire. Construct a dike to protect the wastewater treatment plant.

Essex. Implement a temporary building moratorium in the flooded areas until studies to prevent future damages are completed.

Franklin. Remove unused bridge on Old Route 32.

Norwich. Reconsider flood protection plans for the Yantic River floodplain.

General recommendations that could be implemented by most towns or on a regional basis included:

Flood forecast and warning systems.

Development of the ALERT automated flood warning system to help reduce residential and commercial flood losses.

Preparedness Planning. Each community must have a detailed preparedness plan outlining the duties and responsibilities of each department within the town.

Dams. All dams repaired or replaced should conform to current DEP standards. FEMA and the State should investigate development of a program which could provide low-interest loans or other financing assistance to dam owners for repairs of inadequate dams.

Roads and Bridges. Design of replacement bridges should be in accordance with current standards providing adequate protection from debris and scour-related failure.

Channels and culverts. Development of a continuous maintenance program should be required and carried out

by local public works or park departments to maintain the flow capacity of both natural and man-made channels.

Erosion control. Proper erosion control measures should be required on all cleared land under construction, and soil conservation practices should be used on agricultural land.

Floodplain zoning. Floodplain zoning ordinances should be enforced by all towns, and open space corridors and natural valley storage areas should be retained in their existing conditions.

Flood insurance. A technical assistance program should be started to inform and educate people about the NFIP, and high-hazard floodplain areas should be posted.

Ninety-Day Progress Report. Following completion of the Interagency Flood Hazard Mitigation Report, it was reviewed by the Federal and State agencies with representatives on the team. NWS, SBA, FHWA, and EPA provided comments to the FEMA regional director within an established 30-day response period. Each of these agencies indicated their general support of and concurrence with the recommendations in the report.

Ninety days after the original hazard mitigation report was prepared, seven of the Federal agencies (FEMA, NWS, EPA, SBA, COE, ASCS, and FHWA), and the DEP Water Resources Unit reviewed the progress that had been made in implementing the recommendations. A report describing the progress was submitted on October 15, 1982. (100)

The report indicated progress with several general hazard mitigation opportunities, including:

- Widespread support for development

of an ALERT system.

- Award of a contract to review dam safety.
- All communities participating in the NFIP.

Problems with implementation of the general recommendations were also noted, such as:

- Concern about legislative approval of the ALERT system.
- Lack of funding for repair of private dams.
- Conflicts between FEMA regulations and towns regarding restoration of bridges to pre-disaster design versus replacement to the 100-year design.

With regard to specific hazard mitigation opportunities, progress was noted in a number of areas, such as:

- Milford City Hall basement has not been reoccupied.
- Franklin officials have made a request for funding to remove the Old Route 32 bridge.
- Several methods are being explored by Wallingford, SCS, and DEP of reducing the flood hazard vulnerability of the Gopian Mobile Home Park.

Problems included:

- A review of the floodplain ordinance in Wallingford indicated the ordinance not being strictly enforced.
 - Homeowners in Franklin that received substantial damages were uninsured and, therefore, not eligible for acquisition of their properties under the FEMA Section 1362 program.
 - Watershed communities above Norwich do not support an SCS proposed solution to flooding in Norwich.
-

SECTION 406 HAZARD MITIGATION IMPLEMENTATION MEASURES

Section 406 of Public Law 93-288, and the Federal-State Disaster Assistance Agreement No. FEMA-661-DR, required the State of Connecticut to prepare a hazard mitigation plan in exchange for receiving Federal financial assistance for the June 1982 floods. The plan, Section 406 Hazard Mitigation Implementation Measures, was prepared by the DEP Natural Resources Center and Water Resources Unit. It was completed and signed by the Governor in August, 1983.

The plan provided a very brief description of the various natural hazards to which Connecticut is subject, including the floods of June 1982. It then inventoried existing mitigation measures implemented by Federal, State, regional, municipal, and private organizations. It also described mitigation measures implemented or investigated for the towns addressed by the Interagency Hazard Mitigation Team Report and by State or Federal agencies.

In preparing the report, DEP submitted a questionnaire to twenty State agencies requesting information on their roles in flood mitigation, preparedness, response, and recovery. The responses, combined with information concerning the existing situation and known problems, resulted in development of a large number of recommendations for flood hazard mitigation. The recommendations were divided into first and second priority action items. The first priority actions were to be supervised directly by the Governor's office, and responsibility for the second priority items was delegated to DEP. (101) Information provided for both first and second priority actions included: required action, when it should begin, who has responsibility,

source of funding, lead agency, and costs and benefits of the action.

First priority actions were divided into short-term and long-term actions. The nine short-term actions included, among others: preparation of a State statute on Flood Management; improvements in the dam safety program; a workshop for commercial and industrial property owners of flood preparedness; and development of an automated flood warning system for all state owned dams posing a significant threat to public safety.

Nine long-term actions included, among others: draft legislation to require a standard for municipal road, culvert and bridge construction and reconstruction; revised Emergency Operations Plans for all State agencies involved in responding to floods; a workshop(s) on updating municipal emergency operations plans to include a flood element; and implement a pilot program for a statewide automated flood warning system.

Sixty-seven second priority actions were divided into categories: legislative and regulation actions (5); education (6); planning and special studies (16); coordination (12); funding (9); staffing (4); and policy and program (15).

NATIONAL WEATHER SERVICE DISASTER SURVEY REPORT

Beginning June 9, a survey team composed of several representatives from National Weather Service Offices in Connecticut, New York, and Massachusetts conducted a survey of the southern New England area affected by the June 1982 floods. The team examined the warning services that were provided by the National Weather Service, how precipitation and flooding data were collected, internal

NWS communications, dissemination of information to users, and user response to the NWS information. Based on their investigations, the survey team developed a series of findings and recommendations. The results of their survey are contained in a report titled Disaster Survey Report, June 5-7, 1982, Southern New England Flood. (102)

The report stated the following general conclusions:

The NWS role in providing forecast and warning services to the affected people during the flood event was commendable in many instances.

It was remarkable during this flood event that not more lives were lost. Part of this is attributable to the heightened public awareness that resulted from the ... services provided by the NWS.

While the flood potential and special weather statements heightened the awareness of flooding, the recognition of the magnitude of this event, in comparison to other less serious floods, was not sufficiently conveyed to public and disaster officials. There were also a number of internal NWS problems.

Among the recommendations made by the survey team were:

- Implement floodproofing measures at the NERFC offices.
- WSO Bridgeport should improve its spotter rainfall network to provide data on small streams.
- Terms such as major and severe should

be used in NWS releases to identify potential major flooding, and releases should be more action-oriented by including information such as need for caution and comparison with recent or record floods.

- Clarification of responsibilities of the NERFC in Bloomfield, WSFO in Boston, and WSOs need to be specified in dealing with flash flooding and floods on small streams.
- Procedures should be established such that the NERFC or WSO alert OCP officials whenever there is the possibility of potential flood problems, especially prior to weekends or holidays.
- NAWAS should be used during a flood event to convey warning and flood information to State and local fanout points.
- Real-time reporting precipitation stations should be installed as needed.
- The local Flood Warning System used in Norwich should be expanded to other communities prone to flood problems who express an interest and willingness to commit the volunteer resources necessary to implement an effective self-help program.
- The ALERT automated local flood warning system should be promoted and advocated as an effective non-structural measure to the State of Connecticut and individual communities and areas that have significant flash flood problems.

Many of the recommendations contained in the report had been implemented by the fall of 1983.

DAM SAFETY PROGRAM

DAM SAFETY PROGRAM EVALUATION REPORT

The special flood relief legislation enacted after the June floods included a requirement that DEP undertake a comprehensive study of the State's dam safety program. The report was to:

- Estimate the number of public and private dams requiring repair.
- Review the function, environmental impact, and public benefit of those private dams in need of repair which either pose a significant threat to public safety or provide substantial public benefits.
- Review the adequacy of existing authorities, procedures, staffing, and funding pertaining to dam safety.
- Make recommendations for improving dam safety regulations and alternative mechanisms for funding the repair or removal of public and private dams.

The DEP Water Resources Unit contracted with a consulting engineering firm to conduct the study and to develop a computer data base management system to compile all available dam information. The report, Connecticut Dam Safety Program Evaluation Report, was completed in February 1983. (102)

COMPREHENSIVE DAM SAFETY PROGRAM

The DEP Water Resources Unit evaluated the consultant's report and subsequently developed a comprehensive dam safety program to be phased in over

a two year period. A report describing the proposed program and draft legislation to authorize and fund the program was submitted to the Legislature in early 1983. (101,103)

The dam safety program proposed by the Water Resources Unit included necessary legislative actions and WRU activities. The actions proposed for legislative action in 1983-84 were:

- Appropriation of \$200,000 to fund six positions for the Dam Safety Program.
- Require all dams within Connecticut to be registered with the Commissioner of DEP; establish a fee for such registration to help offset program costs; and require the Commissioner to establish a schedule and periodically inspect all dams.
- Establish a low-interest loan program to assist private owners with repair of their dams.
- Permit a municipality, through its flood and erosion control board, to enter into agreement with the State to receive assistance with maintaining and/or ensuring the safety of a dam when such structure provides a substantial public benefit to the municipality.
- Allow the Commissioner of DEP to undertake necessary repairs to ensure the safety of State owned dams which do not exceed an expenditure of \$1,000,000.

The Water Resources Unit submitted these proposals to the legislature in three proposed pieces of legislation (An Act Concerning Dam Safety; An Act Concerning Funding For Municipal Flood And Erosion Control Board Dam Safety Systems; and An Act Concerning Funding For Low-Interest Loans To Owners of Private Dams), along with supporting

background information.

For the 1984-85 legislative session, WRU proposed that the legislature enact comprehensive dam safety legislation, to be drafted by DEP in 1983; provide funds to undertake repairs to State owned dams as deemed necessary by DEP to ensure their safety; and, based on a report to be prepared by DEP, provide necessary resources to continue the development of a Comprehensive Dam Safety Program.

The legislature passed PA 83-38, An Act Concerning Dam Safety, during the June session in 1983 (Appendix F). The Act provided most of what DEP had proposed except that the authorization for DEP to construct or repair dams and flood control structures was limited to projects costing up to \$250,000.

Passage of the dam safety legislation permitted the DEP Water Resources Unit to make substantial progress during 1983 in implementing a comprehensive Dam Safety Program. The WRU priorities established for 1983-84 were:

- Maintain an updated inventory of all dams.
- Implement a dam registration program with a registration fee.
- Initiate a standardized inspection program, supported by inspection fees.
- Establish formal enforcement procedures.
- Expedite repairs to State owned dams.
- Expedite engineering reviews submitted by private dam owners.
- Promulgate regulations to implement loan programs.
- Participate with municipal flood and erosion control boards.
- Draft comprehensive dam legislation.

For 1984-85, WRU proposed to: submit a report to the legislature reevaluating Dam Safety Program needs; promulgate dam safety regulations; evaluate the need for a public notice process in issuing dam permits; report to the legislature on the feasibility of instituting a State tax on all privately-owned real estate located on the shores of a lake or pond formed by a State-owned dam; and continue to implement the established Dam Safety Program. (103)

REPAIR OF STATE-OWNED DAMS

The emergency flood legislation (PA 82-1) provided \$4.5 million to repair State-owned dams, both those damaged as a result of the June floods and others in need of repair. As of September 1983, most of these funds had been committed by DEP to begin detailed engineering inspections on nine dams and design and repairs on several others. Included in this group is the damaged Messerschmidt Pond Dam in Westbrook which DEP acquired from a private owner in October 1982.

As of December 1983, repairs had been completed on eight of the 13 State-owned dams that were damaged during the June floods, and the other five were in repair or design stages. DEP did not plan to rebuild the two State-owned dams that failed (Mansure Pond Dam and Lower Joshuatown Pond Dam). (60,101)

FLOOD CONTROL STUDIES AND PROJECTS

STATEWIDE SURVEY OF FLOOD PROBLEMS

Following the June floods, DEP received several requests from town officials for flood control studies and projects. Many of these were for areas that had not previously been identified as flood hazards. In response, DEP requested each town to identify the type and location of their flood problems. Forty-five towns provided information to DEP. DEP Water Resources Unit used this survey data along with other information to reassess priorities for flood control projects. (86)

CORPS OF ENGINEERS INVESTIGATIONS

The COE initiated reconnaissance studies (Section 205 studies) in more than a dozen watersheds to determine if Federal involvement in a flood control project was justified. The areas investigated by the COE included (101):

- Wepawaug River, Orange and Milford
 - Mad River, Waterbury
 - Means Brook and Burying Ground Brook, Shelton
 - Several small watersheds, Danbury
 - Beaver Brook, Ansonia
 - West River, New Haven and Woodbridge
 - Quinnipiac River, Wallingford
 - Miller's Pond, Waterford
 - West River, Guilford
 - Morris Creek, New Haven
 - Nonewaug River, Woodbury
 - Falls River, Westbrook and Essex
-

SOIL CONSERVATION SERVICE STUDIES

After the June floods, the SCS reassessed its priorities for watershed investigations being conducted as part of the Central Coastal River Basin Study. It also added two watersheds to the study: the Indian River in Milford and Orange and the Menunketesuck River in Clinton (101).

- a) to evaluate the reduction in flooding on the Farm River which could have been realized with certain previously recommended flood improvement projects in place; and
 - b) to verify the accuracy of the computer model utilized to establish stream channel encroachment lines along the Yantic River in Norwich. (104)
-

FEMA FLOOD INSURANCE STUDIES

The DEP Water Resources Unit requested that the Federal Emergency Management Agency perform new Flood Insurance Studies for the Falls River in Essex and Westbrook, the Pattaconk River and Great Brook in Chester, and the Deep River in Deep River. These restudies were requested because of the observed flood levels, changes in stream hydrology as a result of dam failures, channel modifications caused by flood waters and post-flood channel improvements, and removal or modification of bridges.

In response to these requests, FEMA funded a restudy of the Falls River because of the drastic changes in stream hydrology due to several dam failures and extensive channel improvements by the SCS. Restudies of the other two streams had not been approved by the fall of 1983. (21)

YANTIC AND FARM RIVERS STUDY

The DEP Water Resources Unit authorized a special flood study of the Yantic and Farm Rivers, designed to report on the nature and extent of the June 1982 flooding. The objectives of this special study were:

ADDITIONAL INITIATIVES

FLOOD FORECAST AND WARNING SYSTEMS

Prior to the June 1982 floods, the Connecticut DEP, with the assistance of the NWS Northeast River Forecast Center, developed a preliminary proposal for a statewide automated flood forecast and warning system known as ALERT (Automated Local Evaluation in Real Time). The proposed system included numerous automated precipitation, temperature, tide and stream gages at selected locations throughout the State and a series of base stations at strategic points to receive the data generated by the gaging stations.

Intended primarily to provide warnings for flash floods, the system would permit users (NWS and State and local officials) to be aware of the actual amount and rates of rainfall and river rise occurring in the monitored watersheds. This "real-time" information combined with NWS forecasts of additional precipitation and a computerized model of the watershed, would permit immediate prediction of the time and level of flooding. Awareness of flood potential would be increased significantly, and six to twelve hours of additional warning time would be provided. The extra warning time would enable businesses to move contents of stores and factories and give them time to employ floodproofing materials and procedures. Homeowners would be able to save automobiles and contents of garages, basements and first floors.

After the June floods, DEP continued to work with NERFC and SCS

and developed a proposal for the equipment and costs involved. The total statewide program was estimated to cost about \$1,000,000. The State would design the network and purchase and install equipment. NERFC would provide guidance on the purchase, installation and use of the hardware, as well as assistance with the use of NWS computer software specifically designed for the system. The Office of Civil Preparedness would work with municipal officials in preparedness planning, and SCS would work with individual property owners to develop flood preparedness plans which tie into the automated warnings. Municipalities wishing to participate in the program would be asked to develop and maintain a flood preparedness plan, to provide an annual maintenance fee for equipment, and, possibly, to purchase the base station computer.

In 1983, Representative Lyons of Stamford submitted legislation to create an automated flood warning system. The system would consist of about 20 sets of automated temperature and precipitation gages, stream and tide gages, plus computer access to and analysis of data for about 20 of the most flood prone subregional drainage basins. The bill was supported by many organizations and municipalities, including FEMA, DEP, OCP, the Housatonic River Commission, and the towns of Southington, Norwich, Hartford, and Stamford. Because the bill was not submitted as part of the original DEP budget request, and due to the newness of the concept and the limited State budget for FY 84, the bill was not passed.

Momentum for the project, however, continued to increase. On April 7, 1983, the DEP Commissioner issued a policy requiring that an automated flood warning system be required as part of

any flood control project. The Governor endorsed a flood warning system by including it among the first priority items in the Section 406 Hazard Mitigation Implementation Measures report released in August 1983.

DEP planned to resubmit a new flood warning system proposal in the 1984 legislative session. SCS and DEP were also negotiating to set up the precipitation monitoring portion of the system and two pilot municipal systems. DEP hoped that, if an agreement was reached between DEP and SCS for the pilot projects and the statewide precipitation network, the legislature would follow through with a full funding package. (86,99,100)

WORKSHOPS AND CONFERENCES

The 1982 floods led directly to a series of DEP sponsored workshops and conferences in 1982 and 1983.

Flood Management Workshop: On October 27, 1982, DEP and OCP conducted a workshop to promote the development of improved municipal flood management programs. Planning for this workshop began in February 1982, but attendance at the workshop increased dramatically as a result of the June floods. Workshop topics included: Federal and State assistance; drainage basin concepts; operation and maintenance of flood structures; development of a stormwater management plan; development of self-help early warning systems; emergency damage reporting; avoiding coastal flooding and erosion impacts; and floodproofing. Approximately 300 municipal officials attended. (101)

Commercial and Industrial Property Owners Workshop: On June 22, 1983, DEP, DED, and the COE sponsored a workshop for commercial and industrial flood preparedness. Topics included: Federal and State assistance; warning systems; flood-proofing; preparedness; and use of a "flood audit" to determine the benefits and costs of undertaking flood preparedness measures. (101)

Dam Safety Conference: On September 26 and 27 DEP sponsored a conference for dam owners. Topics included: COE dam inspection program; dam failures in Connecticut in June 1982; hydrologic and hydraulic considerations for dam safety; investigation and repair of deficient dams; responsibility for dam safety; operation and maintenance; emergency operations plans; insurance; and DEP regulations. (101)

FEDERAL-STATE FLOOD CRITIQUE

On January 12, 1983 representatives from FEMA and seven State agencies met at OCP offices in Hartford to review the performance of Federal, State and local government efforts in response to the June 1982 floods. Discussions concerned the development of damage estimates for the disaster declaration request; dealing with media and political inquiries; location of Disaster Assistance Centers; assistance to individuals; public assistance; and hazard mitigation. (105)

ACQUISITION OF FLOOD DAMAGED PROPERTIES

FEMA administers a program (Section 1362) that authorizes it to acquire properties damaged by floods under certain

conditions. The structures must either be damaged 50 percent or more by a single flood or 25 percent or more by floods three times within five years. The program has several restrictions, the most important being: structures must be covered by flood insurance; owners must be willing to sell the property; and the community or State must be willing to take title to the property and convert it to public open space.

The FEMA regional office in Boston identified three properties in Mansfield that appeared to meet all program criteria. The three property owners were all covered by flood insurance and were interested in participating in the program, the structures were damaged more than 50 percent during the June floods (and have a history of flooding), and the Town Council of Mansfield voted in December 1982 to enter into an agreement with FEMA to participate in the program. As of September 1983, FEMA was conducting a review of the properties and an environmental assessment of the impact of acquiring the properties. (106,107)

TECHNICAL ASSISTANCE TO INDUSTRY

In September 1982, DED received a \$100,000 grant from the Federal Economic Development Administration for "Development of an Adjustment Strategy for the State of Connecticut (Disaster Recovery)". Under this grant, technical assistance teams were established to provide a more complete follow-up to businesses affected by the flooding. The grant is also being used by DED to prepare an "Emergency Assistance Response Plan" outlining the mobilization of its staff members who are designated to respond in assigned regions of the State in

the event of a future disaster. (28,108)

CRISIS COUNSELING

The Department of Mental Health provided crisis counseling to flood victims through Project H₂O: Help To Others In Connecticut. This project was funded by a \$71,000 grant from the National Institute of Mental Health. The purposes of the project were:

- To identify unmet needs of flood victims;
- To help those still in need of assistance, where possible;
- To encourage positive coping patterns and continued use of existing community resources;
- To determine what support systems were employed by those affected by the disaster; and
- To document needs met.

The project began in December 1982 and continued through June 1983. The DMH assembled a small staff of mental health professionals for the project and gave them special training before initiating field outreach. Initially, the project team hoped to obtain the names of flood victims from FEMA, but FEMA was unwilling to release this information because the names of flood victims are considered confidential. As an alternative, the project team reviewed records maintained by DIM to identify areas that were severely affected by flooding.

Using this information, the team made telephone calls and door-to-door visits in the affected areas seeking flood victims who were in need of crisis counseling. Between January and June 1983, 681 clients were interviewed as

part of the project. Table 4.4 provides a summary of information on those interviewed.

In June 1983, Project H₂O presented a conference entitled Mental Health Intervention: Who Needs It? Workers and Victims in Disaster. Red Cross personnel presented information about the impact phases of disasters. Project H₂O staff presented case histories of three clients and a worker to illustrate emotional reactions to disaster stress and guide discussion of ways to cope with stressed clients.

A final report on the project was prepared which provides details on the needs of disaster victims, including disaster workers, and makes many recommendations for improving services to victims of the next disaster in Connecticut. Suggestions from Project H₂O clients and participants at the June conference are included on the following topics: State government; city/town government; Small Business Administrations; Disaster Assistance Center; Internal Revenue Service; Red Cross; and health/mental health intervention.

Recommendations for conducting future crisis counseling projects included:

- redesign of forms used and modifications to information collected from victims.
- use of staff from additional disciplines such as gerontology, nursing, and sociology.
- maintain collaborative relationships with agencies involved in the disaster.
- maintain consistent and ongoing training of mental health workers through role-playing, improving listening skills and increasing the awareness of all disaster workers that their interventions

affect the mental health of victims.

- maintain a close working relationship with FEMA.
 - include worker stress and their needs for support and debriefing after the disaster in the plan of follow-up.
 - develop an outreach program that also focuses on the health care needs of victims. (80,109).
-

TABLE 5.1: PROJECT H₂O SUMMARY (CRISIS COUNSELING)

Number of individuals served (persons who have been and/or are currently receiving services through the Section 413 program).

Total number persons	681
Total number females	411
Total number males	270
Total number minority	54
Total number children (under 18)	58

Primary problems: While some individuals may have more than one problem, only one problem per individual should be indicated.

TYPE OF PROBLEM	NUMBER OF INDIVIDUALS FOR WHOM THIS IS THE MOST SALIENT PROBLEM
-----------------	--

Agitation/depression/anxiety	150
Disaster fears	331
Acting out behavior-adults	0
Acting out/school adj. children	1
Alcohol/Drug abuse	4
Marital/family problems	16
Physical complaints	185
Irritability, arguing	8
Sleep disturbances	24
Eating disorders	3
Accident proneness	0
Suicidal	0
Need for information/assistance	52
Other (specify)	18

Services provided: Show the number of individuals receiving each service. More than one type of service may be indicated per individual.

ASSISTANCE PROVIDED	NUMBER OF INDIVIDUALS
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Screening and diagnostic	681
Information and referral	628
Individual counseling	159
Group counseling	0
Advocacy	21
Other (specify)	2

Source: Project H₂O: Help to Others in Connecticut. Final Report. 1983.
Dr. Joseph M. Torres, et al.

CHAPTER 6

SUMMARY OF FLOOD DAMAGES AND RESPONSES IN SELECTED MUNICIPALITIES

Battered Essex Struggles To Dig Out

By CLAUDIA VAN NES
Courant Correspondent

ESSEX — Most shoreline communities were returning to normal Tuesday, but the Ivoryton section of Essex still looked more like a war zone than the quiet village it was four days ago.

National Guard troops and state police were positioned along Essex roads, allowing only residents and emergency personnel to enter the Ivoryton and Centerbrook sections. An 8 p.m.-to-dawn curfew had been imposed because of scattered looting.

Water service had been restored in Deep River, schoolchildren went back to school in

Clinton. But Essex, a community of stately homes, many of which were built by sea captains, remained isolated. There was no public drinking water, schools were closed and roads remained close to weekend flooding.

Drab green National Guard trucks were dispensing drinkable water to residents, and the Cross had set up a disaster relief station, issuing food, blankets and portable toilets were set up in Essex, Centerbrook and Ivoryton.

Selectman James Kenney said he worked in the town for 20 years. "I'll never forget it,"

he said of the two dams that burst Sunday, sending a torrent of water crashing into homes and washing out roads.

Haddam Meeting Today To Act on Flood Repair

HADDAM — Voters will decide today at a special town meeting whether to appropriate about \$332,000 for repair or replacement of four town bridges damaged by the June 6 flood.

The cost of more than \$7,500, Lundgren said.

The requested \$332,111 will pay for the repair or replacement of the Dublin Hill Road, Beaver Meadow Road, Ponsett Road and Scovil Road bridges. The Ponsett and Scovil Road bridges are not passable now, Lundgren said.

The actual low bids for the projects add up to less than the total \$332,111 requested, but selectmen calculated the appropriation based on the second lowest bids plus 10 percent, for contingency purposes. Lundgren said.

begin at 8 a.m. at Selectmen's office.

Flood-damaged bridge opens

By ROBERT FREDERICKS
Telegram staff writer

MILFORD — One of five bridges damaged by flood waters June 5 has reopened but it may be several weeks before the others are repaired, according to Public Works

Director Donnelly said bridges at Bridge and Maple Streets will be repaired "last because it's only a slight inconvenience for people who use them to take other routes."

The public works director said the next job the department will tackle is the bridge at Peck's Mill. He expects a crew to start work on it this week.

receive from the state Emergency Fund. The selectmen expect to receive the money by the end of the year.

Chester Storm Repairs

By LUCY GUSTAFSON

CHESTER — Final assessment of the cost of flood damage to roads and bridges in Chester is \$900,000 if the Straits Road and the No. 2 bridge of North Main Street are rebuilt - and \$1,200,000 if a third bridge, also on North Main Street which badly needs attention - is done. First Selectman Robert Blair reported at the Board of Selectmen's meeting Tuesday evening.

As President Reagan has declared the area a federal emergency area, the

Blair noted wryly.

Also the town must repair the wooden bridge on Wig Hill which survived recent flood, but deterioration has set in and the bridge can only be used one way. Blair said it must be repaired or replaced.

The first selectman explained that the assessments on flood damage were done by the Federal Disaster Office in Middletown that sent out teams to the various stricken towns and areas. These assessments were evaluated in

plans for the Canine Control Shelter which has been approved by all town boards and has received a special exception to be constructed on land owned by David Joslow off Route 148 up the hill and across from the Chart House Restaurant in the present Industrial Park.

However, in granting the special exception a stipulation was made that it must have barbed wire on top of the chain link fence planned to surround the canine control shelter.

relief. The town, through the non-profit organization of Chester Housing Inc., is planning to construct 17 units which will be rented to elderly who qualify.

Blair reported that Joslow agrees to a tax based on net income of those who rent the units and the Chester Housing Inc. will be in charge of the operation of the project. The selectmen approved of this plan.

In conjunction with the elderly housing units, the selectmen also reviewed the proposed agreement with the town's

the board

Bristol Flooding Milder Than in 1955, River Reading Shows

By MICHELE BLOCK
Courant Staff Writer

BRISTOL — Despite more than \$5 million in damage caused by flooding earlier this month, it appears that the storm was far less severe here than the flood of 1955. A reading of a permanent gauge on the Pequabuck River near Forestville Center, taken after the recent flooding, indicated the river reached about 1,540 cubic feet per second; the river reached a record 11,700 cubic feet per second Aug. 19, 1955, said Michael Cervione, a hydrologist

with the U.S. Geological Survey. Based on that reading, the recent storm would be characterized as only a 10-year flood, meaning a flood likely to occur once a decade. Cervione said the flood of 1955 was classified as one likely to occur only once in a century. Cervione said.

He emphasized that the gauge reading must be confirmed by high-water readings that now are being taken along the river. But Cervione said, the recent 10-year flood estimate is similar to readings found in other areas tributaries of the Farmington River.

In contrast, Cervione said, the Geological Survey — which now is calculating flood levels all over the state — has assigned a 200-year flood designation to the heavily hit town of Waterford.

However, the officially mild flood estimate in Bristol is not stopping officials and residents from taking steps to prevent a recurrence and to derive some benefit from the storm.

City Council member John J. Leone Jr. said he will ask that the Public Works Board look into the kind of flood control work that

can be incorporated into the ongoing \$1.5 million renovation of Rockwell Park.

The park is divided by the Pequabuck River, which overflowed its banks and sparked a call for action from about 50 area residents on the park's south side whose homes were flooded. Leone said. Leone said the storm also revealed problems with the drainage system along lower Tulp and Jacob streets that the city may have to correct.

City officials also plan to use the lack of any flooding in the

downtown area to support their efforts to reverse a federal designation of the area as a flood plain.

City Engineer William H. Katt Sr. said his staff is now taking high water elevations on a brook upstream from the area to show what an extensive drainage system installed several years ago has solved any previous flooding problem.

Under the federal designation, which became effective last November, the downtown area requires building owners to provide expensive annual flood protection

that city officials insist is not needed.

The area includes a 10-acre parcel that city officials hope will soon be developed after lying fallow for more than a decade. Development Agency Director Samuel Kasparian said the new drainage system "came through miraculously" and that now is the time to seek revision of the original flood designation.

However, the city's case for proving the area is safe from severe flooding could be hurt if the preliminary 10-year flood estimate is correct.

PCA would sewer and r Housing. r the place.

allow First into agreement for the the WPCA a formula

FLOOD WARNINGS AND EVACUATIONS

INTERVIEWS WITH MUNICIPAL OFFICIALS

In preparing this report, representatives from 60 municipalities were interviewed (Figure 6.1), as well as more than 30 State and Federal agencies. In most cases, the First Selectman or Mayor was initially contacted and asked to identify those individuals most knowledgeable about the June floods. In some towns, only the chief elected official was interviewed, but in most cases other town officials were also interviewed, including: town manager, police chief, fire chief, civil preparedness director, town engineer (including consulting engineers), public works director, and town clerk.

These officials were asked to provide information about the town's experience with the floods: areas flooded; location of major damage areas; emergency actions, including flood warnings and evacuation; flood recovery; and experiences with Federal and State agencies. Responses varied greatly depending upon the extent of flooding and damages the town experienced and the individuals involved. Interviews were conducted between April and September 1983. A questionnaire was developed and used by the interviewer, but the interview itself was informal, and no one was asked to provide written responses. Information received was generally qualitative rather than quantitative, and information on every question was not available from each town¹². Town experiences with the June floods are summarized in Table 6.1 and discussed below.

With few exceptions, town officials received little, if any, advance warning of the severe flooding they experienced. Norwich was the only town to receive direct notification from the National Weather Service of the potential for major flooding on local streams. A few towns first became aware of the flood potential through the emergency warning system, such as NAWAS, NOAA Weather Radio, and notification by OCP, police, and fire networks. Most reported receiving no direct warning from an official source¹³, and were aware of NWS warnings for "small stream and urban flooding" only through T.V. and radio broadcasts. The "small stream and urban flooding" warning, even when received through the emergency warning system, was not considered adequate by local officials.

In most towns, officials relied upon their knowledge of previous flood events and observations of stream levels. Their emergency actions were tied to the level of flooding observed, not to projected flood levels. This procedure generally allowed officials to barricade flooded roads and provide adequate evacuation warnings to residents, but did not provide sufficient advance warning to permit individuals and businesses to reduce flood losses by removing or relocating property from flood prone areas. Some communities used sandbags to try and keep floodwaters within river banks or from entering buildings. Since the worst flooding occurred Saturday afternoon through Sunday morning, many businesses were closed and no protective action was taken. In some instances, business owners observed the rising waters and took actions based on their previous flooding experiences. In most towns in south central Connecticut,

TABLE 6.1: SUMMARY OF MUNICIPAL RESPONSES

SOURCE OF INITIAL FLOOD WARNINGS				
National Weather Service	Emergency Communications System (OCP, Police & Fire Fanout; NAWAS, NOAA Weather Radio)		Local Observations, Radio, T.V.	
1 ²	Few		Most	
TYPE OF EMERGENCY OPERATIONS PLAN (EOP) USED				
Flood EOP	General EOP		No Written EOP, or EOP not Referred to ³	
1 ²	Few		Most	
EMERGENCY ACTIONS TAKEN				
Evacuation	Rescue	Erection of Barricades	Sandbagging	Movement of Furnishings, Equipment, Inventory
Most	Few	Most	Few	Few
MAPPING OF FLOODED AREAS AND FLOOD DAMAGES				
Delineation of Flooded Areas		Mapping of Damages		No Mapping
1 ⁴		Few		Most
RECOVERY APPROXIMATELY ONE YEAR AFTER DISASTER				
Complete (100%)	Nearly Complete (90-100%)		Significant Work Remaining (Less than 90% complete)	
Few	Most		Few	
TYPE OF RECOVERY WORK REMAINING				
Roads & Bridges	Water Control Facilities	Buildings	Public Utilities	Other (Parks, Landscaping)
Most	Few	None	None	Few
MUNICIPAL PERCEPTIONS OF FEDERAL/STATE DISASTER AID PROCEDURES ⁵				
Adequate		Inadequate		
Many		Many		
INFORMATION AVAILABLE FROM MUNICIPALITIES REGARDING FLOOD LOSSES				
	Full	Partial	None	
Municipal Losses	All	None	None	
Private Losses (Residential & Business)	Few	Many	Many	

¹ Refers only to municipalities interviewed during preparation of this report (see Figure 6.1). Information on each category not obtained from every town. Few (less than 15); Many (16-45); Most (more than 45).

² Norwich was the only community with a specific flood emergency plan, and that maintained direct communications with the National Weather Service.

³ Several communities apparently had emergency operations plans that they did not use during the June 1982 floods. In several cases, one or more of those interviewed were not aware of an emergency plan, even though some type of plan may have existed.

⁴ This was an unofficial map and was not referenced by town officials during the interview.

⁵ Refers to the established procedures; not to the actions of individuals.

Source: Interviews with officials in 60 Connecticut towns, April-September, 1983.

reliance on previous flooding experience proved misleading.

Only one town had a fully developed flood emergency plan with which all emergency personnel were familiar. Many towns apparently did not have written emergency plans; others had plans that were not used. Existing emergency plans usually did not include provisions for alerting or assisting residents and businesses with flood loss reduction measures.

MAPPING OF FLOODED AREAS

Despite the record floods that occurred in many locations, towns did little mapping of the flooded areas. Only one town had an unofficial map of the flooded areas, which was not referenced during the interview. When requested to indicate flooded areas on Flood Insurance Rate Maps or street maps, the individuals interviewed relied mostly upon memory to delineate approximate areas of flooding.

The height of flood waters in vulnerable areas and the sequence of flooding usually were not recorded -- information that would be useful in developing detailed flood warning and evacuation plans. In addition, those interviewed were not always clear as to the cause of flooding: overbank flooding, backwater from blocked or inadequate drainage systems, or torrential runoff. Less than 10 of the towns interviewed had mapped the areas that suffered damage, even though this information -- at least for municipal property -- was readily available.

FLOOD LOSSES

Data on flood losses to municipal property was readily available, largely as a result of the Damage Survey Reports that towns helped prepare in order to receive reimbursement from Federal and State governments. Surprisingly little information was available from town officials regarding damages to houses and businesses. The officials interviewed were often not knowledgeable of the initial estimates provided to OCP immediately after the flood. Except for towns that provided tax abatements for property owners, apparently no updated, accurate estimates of home and business damages were prepared by towns after the flood emergency was over.

RECOVERY

At the time of the interviews, which were conducted from April to September 1983, most towns indicated that their recovery from the flood was better than 90% complete. Many towns had completed all of their flood repairs, but most towns in the hardest hit areas, as well as many in areas which received less damage, still had some flood repairs to make. Most of the remaining repairs were to roads, bridges and small culverts.

DISASTER ASSISTANCE PROCESS

The towns generally expressed satisfaction with the cooperation and assistance they received from FEMA and OPM. Most, however, were not satisfied with the time required to receive approval for project applications and payment from FEMA. Several were also dissatisfied with FEMA's decisions on eligible losses.

There appeared to be a lack of awareness by town officials as to how involved the Federal assistance process would be and how long the damage documentation, verification, and approval would take. There also seemed to be confusion on the part of some officials as to whether they were dealing with Federal or State representatives during the various stages of the Public Assistance process.

SUMMARIES FOR SELECTED MUNICIPALITIES

The flood experiences of several towns are briefly described below, based on information from interviews, newspaper accounts, and State agencies. For each town, a map is included that identifies the major municipal damages. In some cases, areas of flooding and private damages are also shown. The maps were prepared by working directly with town officials or using information supplied by them. All flood damages within a town may not be shown on the maps. Additional information on flood experiences in each of the towns interviewed is located in support files to this report, maintained by the DEP Natural Resources Center.

CHESTER

Flooding from Pattaconk Brook caused most damages in Chester, including five Town and four State bridges. Thousands of feet of roadway were washed out in numerous locations. Several businesses suffered major damages, and

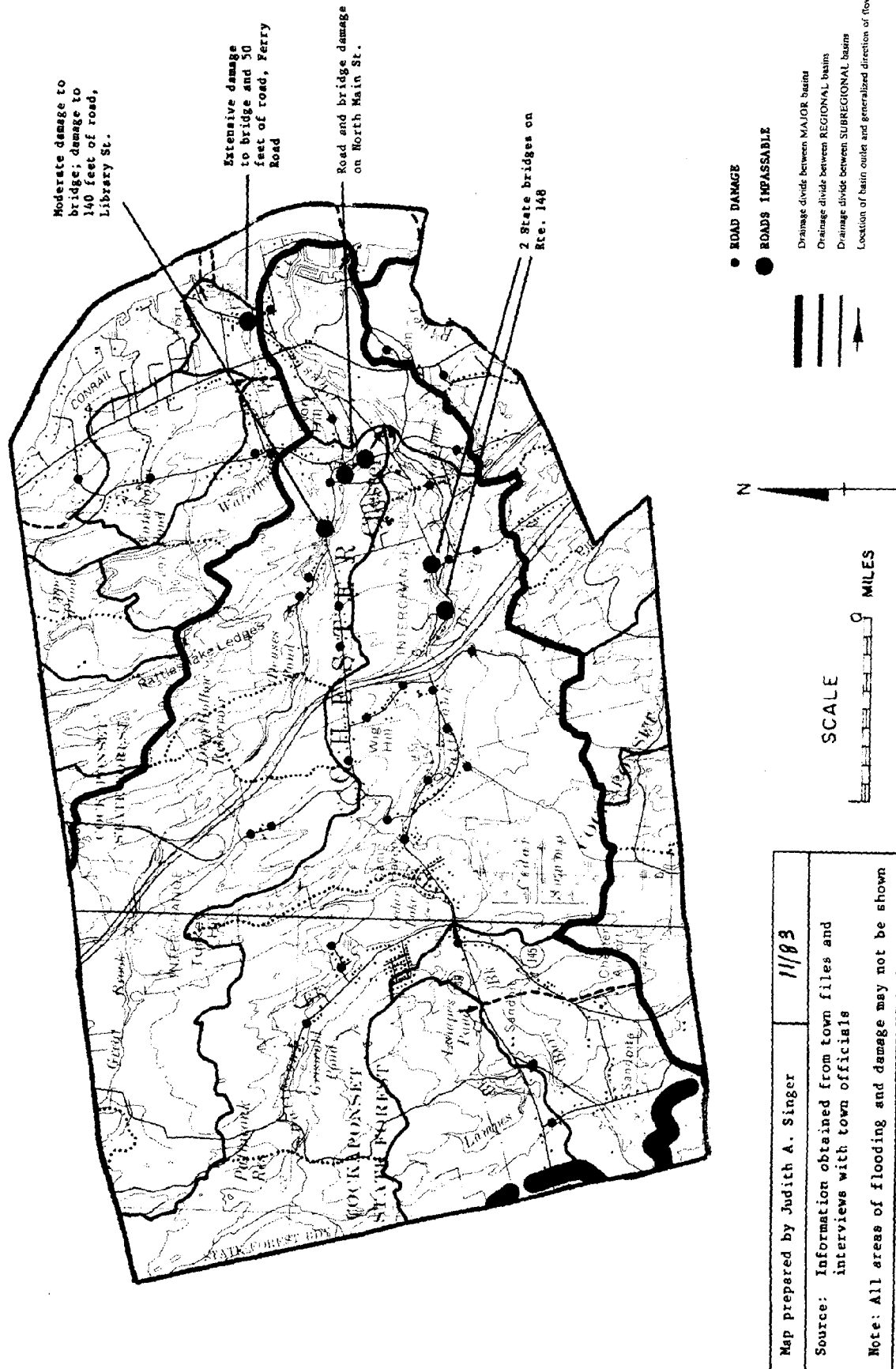
water supplies were interrupted due to damage to certain water mains of the Connecticut Water Company.

The First Selectman and Fire Chief were responsible for emergency actions. They operated from the fire stations, and volunteer firemen performed most emergency activities. Chester reported that it received no assistance from OCP and had difficulty obtaining sandbags. Some sandbags were loaned to the Town from Westbrook, which had obtained them from the National Guard. The Jennings Pond Dam was monitored during the floods by a local consulting engineer who had been conducting a study of it.

Since Chester is within 10 miles of the Yankee Nuclear Power Plant, it has an emergency response plan for nuclear accidents. However, the First Selectman noted the need for additional emergency procedures to respond to floods and provide warnings to residents. During the June floods, no formal warning system was used; officials relied on visual observations and patrolled the Town, alerting people to evacuate. About 35 families evacuated from the Main Street and Deep Hollow areas were sheltered in the fire station or went to friends' homes.

Chester received approval from FEMA for \$318,859 in flood losses, and SCS conducted \$276,692 in emergency stream improvements at three sites on Pattaconk Brook. The Department of Housing estimated 270 homes received minor damage and 30 major damage at a cost of \$1,950,000. The Department of Economic Development estimated 20 businesses suffered a combined loss of over \$1,840,000. One year after the flood, recovery was almost complete. The Town reported some delays in repair work were caused by rainy weather in

FIGURE 6.2: FLOOD DAMAGES IN THE TOWN OF CHESTER, STORM OF JUNE 4-7, 1982



the spring of 1983. A study of the Jennings Pond Dam was still underway. (18,35,40,49,52,110,111)

DEEP RIVER

Deep River officials indicated that the Town has an elaborate communications system. In addition to Town officials, reportedly about one half the town residents use receivers to monitor civil defense and police channels. A public address system, walkie-talkies, and pagers are routinely used, and emergency call boxes are available. Six dispatchers man the Town communications system. The Town reported its annual cost for the communications system was about \$80,000, compared to a \$6,000 average for surrounding communities.

The First Selectman was in charge of emergency operations, assisted by the Deep River Police and State Police. Additional constables were used to assist with traffic control and other emergency services. An initial evacuation notice was called off because it prompted too much confusion. Residents were aware of the flood warnings through radio broadcasts and a message delivered by the First Selectman over the public address system. Nevertheless, the severity of actual flooding was not anticipated. Saturday night, about 50 people were evacuated from Elm Street near the Bushy Hill Dam, which collapsed just after midnight. Two Deep River firefighters staged a dramatic rescue of 3 people from a car that plunged into the rampaging Deep River at the Elm Street Bridge.

Several businesses were damaged, and the Town had damages to roads and bridges, fire station equipment and

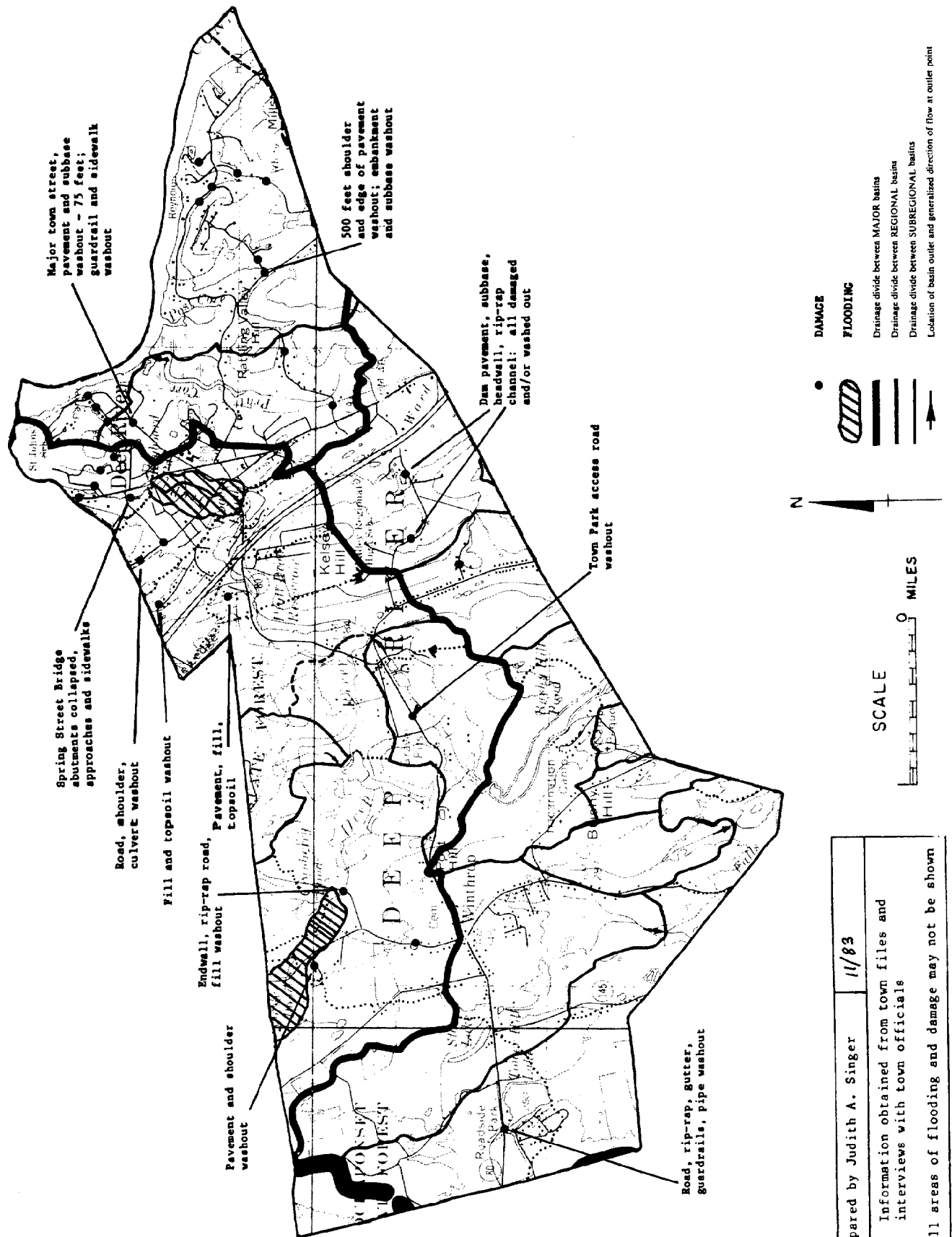
parking area, the Town beach and park area, and a bulky waste disposal site. FEMA approved flood losses of \$222,901, and SCS spent \$9,200 removing debris from the Deep River. DOH estimated 120 homes received minor and one house major damage at a cost of \$620,000. DED estimated three businesses were damaged with losses of about \$1,047,400. By May 1983, recovery was considered about 90 percent complete. (18,35,40,49, 52,112)

ESSEX

Essex was probably the town most severely affected by the June floods. Certainly, it suffered the most dramatic flooding when the failure of the Bushy Hill Dam in Deep River sent a wall of water crashing down the Falls River, causing or contributing to the failure of several other dams downstream and devastating the Ivoryton and Centerbrook sections of Essex.

Town officials received no notification from OCP or NWS regarding potential flooding. They became concerned about possible flooding because of the prolonged heavy rainfall and communication with employees of the Pratt Read Corporation, owner of two upstream dams (including the Bushy Hill Dam) on the Falls River. As water in the river and ponds rose on Saturday night, Pratt Read employees expressed concern for the integrity of the dams, and the First Selectman issued a notice about 10:00 pm to begin evacuating people along the river. The Essex Volunteer Fire Department headed the evacuation effort and was assisted by the Resident State Trooper and civil defense unit. About 140 homes were located along the Falls River, housing about 300 people. Emergency

FIGURE 6.3: FLOOD DAMAGES IN THE TOWN OF DEEP RIVER, STORM OF JUNE 4-7, 1982



workers notified most people by going door-to-door. Others were notified by telephone, and one worker used a loudspeaker. Not everyone evacuated, or was reached by emergency workers before the Bushy Hill Dam burst about 12:30 am, and many people were stranded and had to be rescued.

Essex had no formal or written flood evacuation plan, and did not have information on the inundation area from a dam failure, even though this information had been developed by the Pratt Read Corp. Nevertheless, awareness of the local situation, communication with Pratt Read employees monitoring the company's dams, and quick, decisive actions by town officials prevented any serious injuries or loss of life.

All of the dams destroyed in Essex were privately owned. In sequence, the destroyed dams were: Bushy Hill Dam (located just over the border in Deep River); Clark's Pond Dam (Comstock Dam); Lower Pratt Read Dam; Washburn Dam; Moore, Grove, and Harper Dam (Mill Pond Dam); and Doane Dam.

Most damages in Essex were to private property. DOH estimated 25 homes were destroyed, 75 had major damage, and 500 had minor damage at a cost of \$6,250,000. The major business loss was to the Pratt Read Corporation, a manufacturer of piano parts, which sustained damages of about \$15 million. DED estimated 28 businesses were damaged with losses of about \$22,500,000. Hundreds of feet of roadway and several bridges were destroyed or badly damaged. Essex received reimbursement of \$396,630 from FEMA and OPM for eligible flood losses. The SCS conducted \$1,106,769 in emergency stream improvements at seven sites on the Falls River.

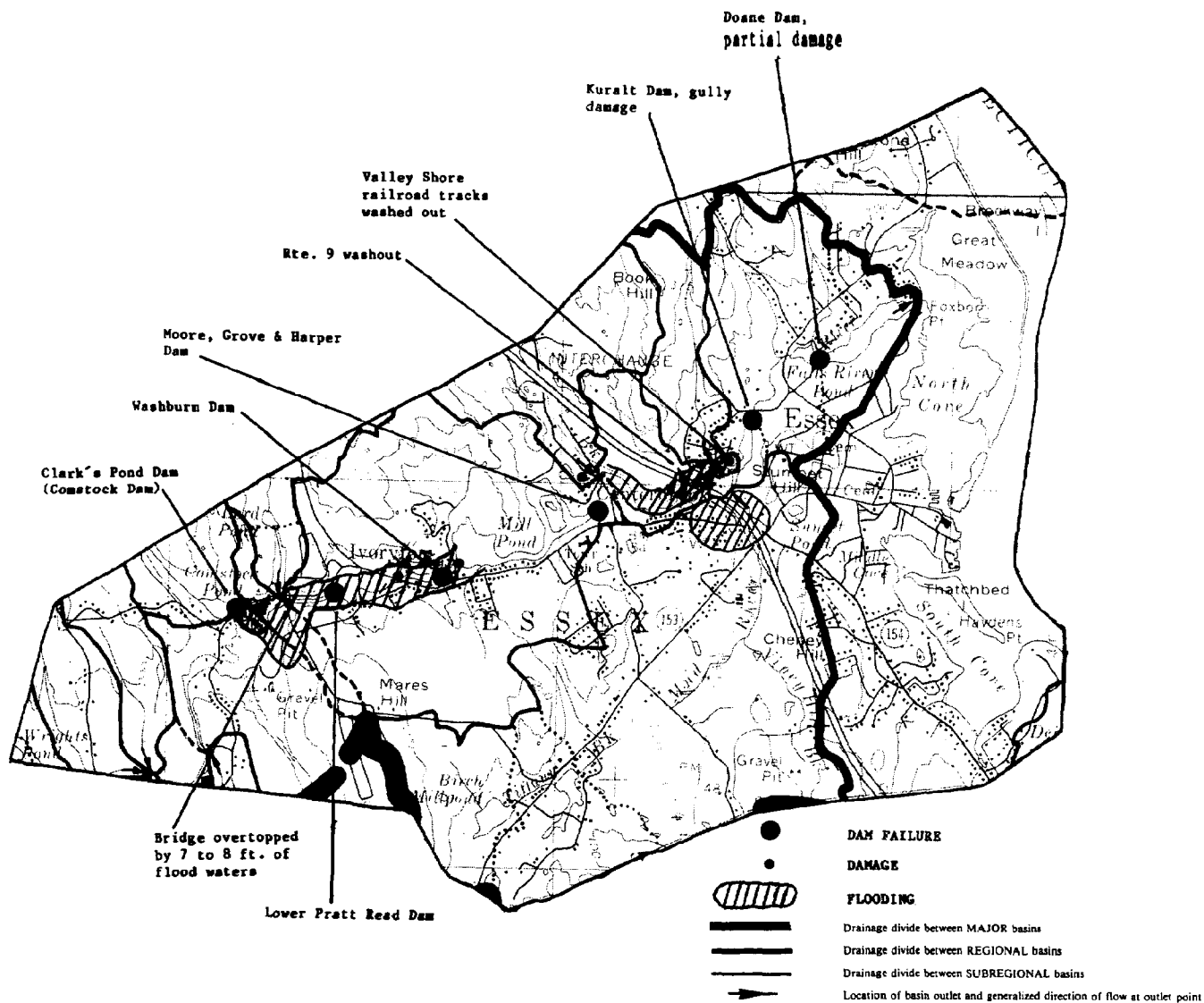
A year after the flood, Essex was still not completely recovered. Culvert repairs and road resurfacing still remained, and one State bridge had yet to be replaced. The Bushy Hill and Mill Pond Dams were expected to be rebuilt beginning in 1983. All but one business had reopened. (18,35,36, 49,52,113,114) (Also see pages 31, 82, and 95.)

EAST HAMPTON

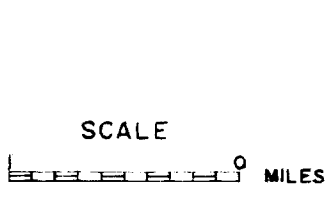
Because East Hampton is located close to the Yankee Nuclear Power Plant at Haddam Neck in East Haddam, the Town has an active civil preparedness program. Several emergency warning sirens are located throughout the town and provide capability for public announcements as well as siren warnings. East Hampton did not find it necessary to use this warning system during the June floods. Two families on low ground near the Salmon River, who had experienced flooding before, voluntarily evacuated during the storm. Flood waters reached about one foot into the first floor of their homes. Emergency shelters (schools) designated in the Town emergency operations plan were not needed.

Water levels in the Salmon River were monitored by the Town police department. When water began rising, the volunteer fire department sandbagged portions of the river, but had no success in containing the floodwaters. The Walnut Avenue Bridge, near the center of East Hampton Village, was also sandbagged. Beginning Saturday night, public works crews handled emergency drain clearance and debris removal. A record height of 14.4 feet (USGS stream gage) was recorded on the Salmon River near State Route 16. Newspaper accounts

FIGURE 6.4: FLOOD DAMAGES IN THE TOWN OF ESSEX, STORM OF JUNE 4-7, 1982



Map prepared by Judith A. Singer	10/83
Source: Information obtained from town files and interviews with town officials	
Note: All areas of flooding and damage may not be shown	



reported that floodwaters on Route 16 were deeper than at any time since the 1938 hurricane.

Damages to Town property were caused by overflow of the Salmon River, rapid runoff from steep slopes, and undersized culverts and catchbasins. Reimbursable losses totaled \$239,081. Most damage was to roads and bridges. A recreational area was also damaged. DOH did not report any housing damages in East Hampton, but OCP files indicated two houses damaged at an estimated cost of \$85,000. DED estimated two businesses were damaged with total losses of \$55,000. By August 1983, the Town estimated its recovery was about 90 percent complete. Although Town officials felt the State and Federal disaster representatives did an excellent job of handling damage assessments, they were not satisfied with FEMA payment procedures -- specifically with the length of time required for payment and withholding of the final 25 percent pending final audit. This process forced the Town to set up a special storm damage account because local revenues were not sufficient to cover repair costs. (18,40,49,50,52,115)

HADDAM

Major flood damages in Haddam were caused by Candlewood Hill Brook. Initial awareness of the flood potential came from town road crews who notified the First Selectman of possible problems. Town officials then began patrolling areas known to be subject to flooding.

Approximately 50 people were evacuated on Saturday night, including evacuation by boat from the Brookside Mall apartments and the Glockenspiel Restaurant in Higganum Center. Some people resisted

evacuation efforts. At one point, the boat firemen were using for rescue capsized, and the firemen were themselves at risk of drowning. Motels and schools were used for emergency shelters.

Several businesses in Higganum Center suffered flood losses. DED estimated 18 businesses were damaged with losses of about \$1,367,000. DOH estimated 135 homes received minor damage and 15 major damage at a cost of \$975,000. Reimbursable damages to the Town of Haddam were \$590,325, mostly for roads and bridges. The SCS conducted \$158,860 of emergency channel improvements on Candlewood Hill Brook. A year after the flood, Haddam estimated that it was 90 to 95 percent recovered. Five major projects were completed by the spring of 1983, and two projects were still in the design stage. All work was completed by the end of 1983. Town officials were not satisfied with the Federal procedures for approval and payment of flood losses, and felt that they burdened the town's operating budget. (18,35,40,116,117)

HAMDEN

Hamden has an active Office of Civil Preparedness and had recently revised its Emergency Operations Plan when the June floods came. During the floods, the local OCP coordinated town emergency services and maintained communications with State and Federal agencies, providing information about local damages and requesting needed assistance. The OCP also coordinated emergency shelter for about 175 people who were evacuated. An evacuation center was set up at the Miller Senior Center, with Town Hall, the Keefe Community Center and the high school used for overflow. The Red Cross

FIGURE 6.5: FLOOD DAMAGES IN THE TOWN OF EAST HAMPTON, STORM OF JUNE 4-7, 1982

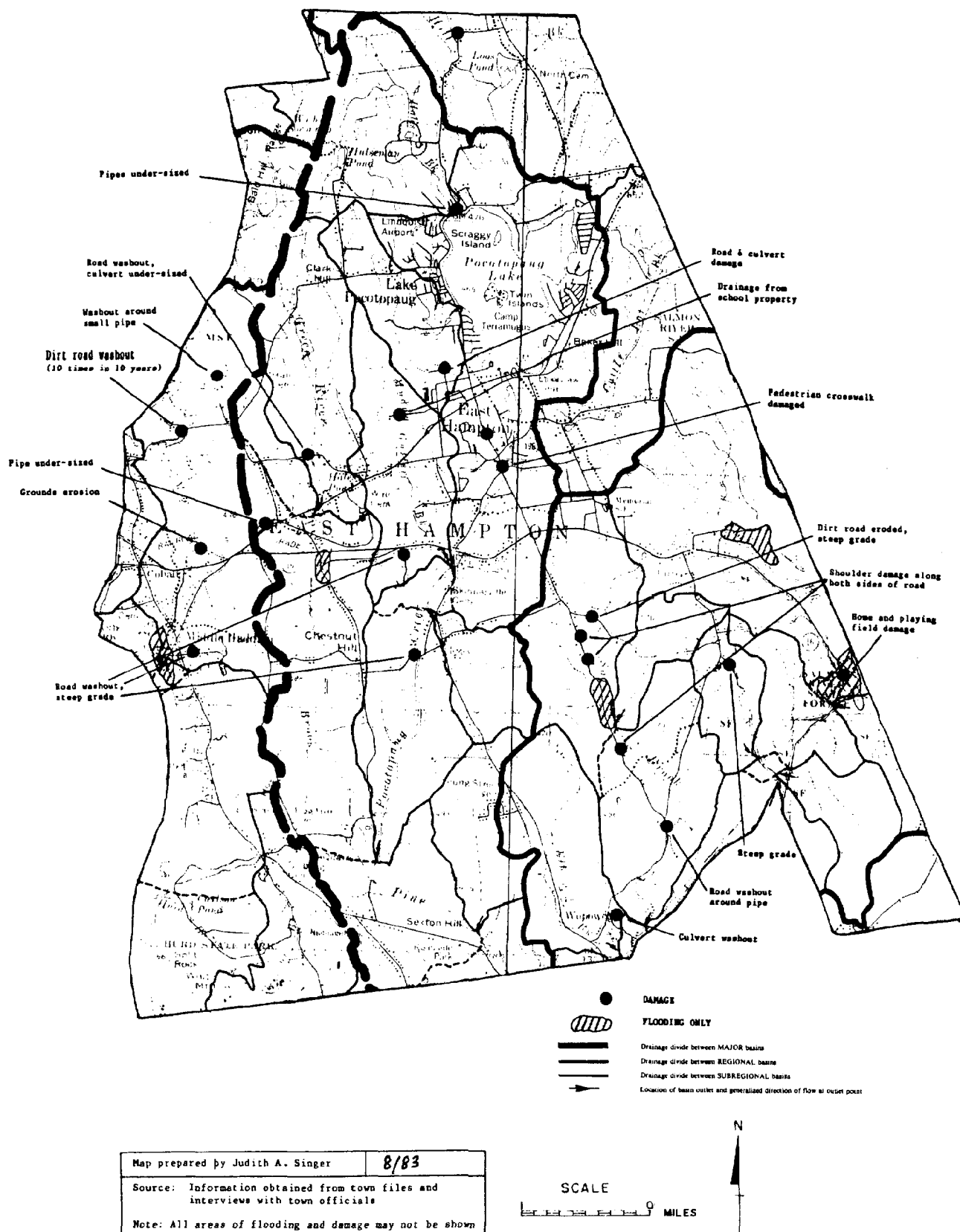
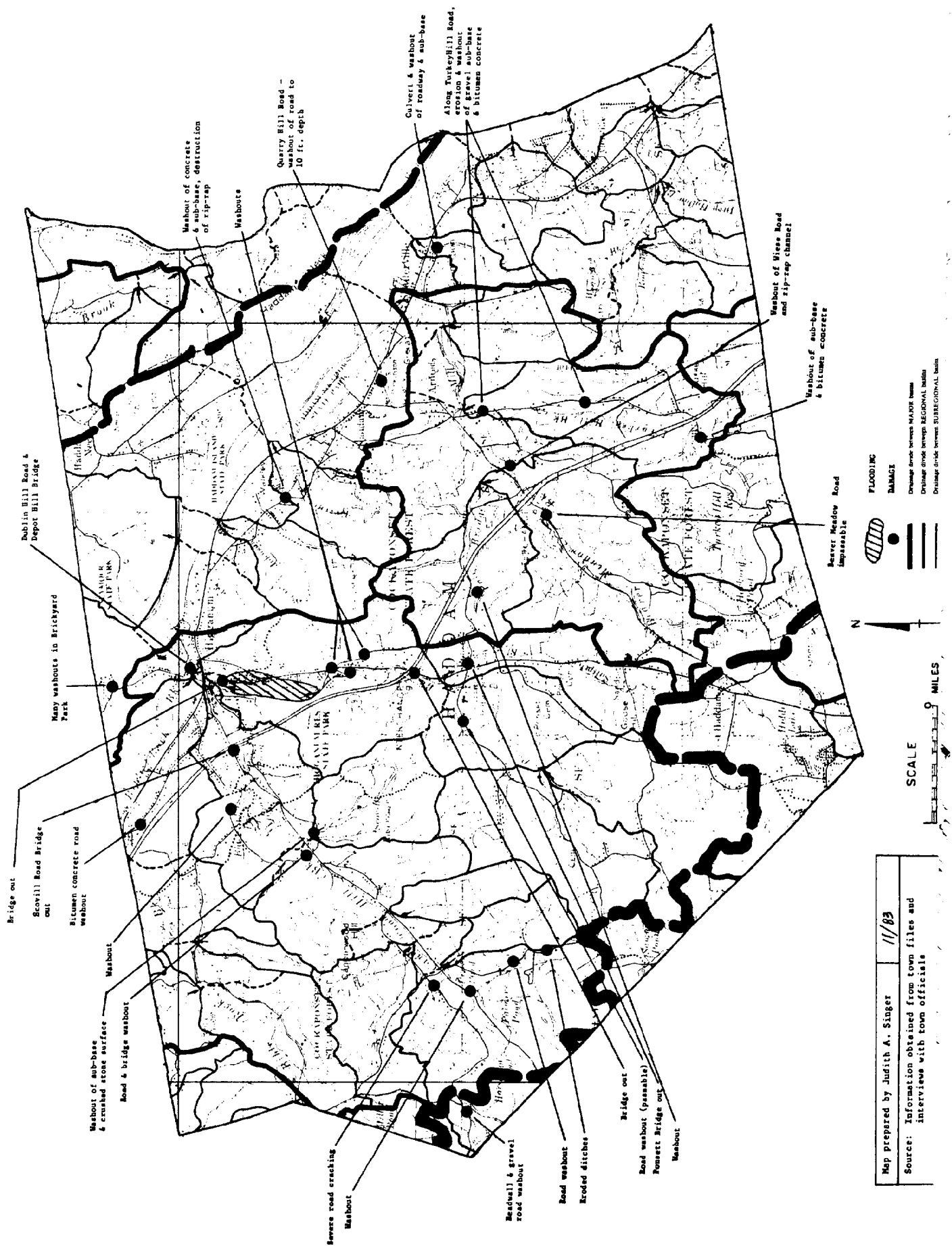


FIGURE 6.6: FLOOD DAMAGES IN THE TOWN OF HADDAM, STORM OF JUNE 4-7, 1982



staffed the centers after they were opened. OCP coordinated food for both evacuees and emergency workers.

The Mayor appointed a Recovery Management Team to organize the physical, financial, and technical aspects of recovery. Four projects were still unfinished as of August 1983, but all repairs to Town property were anticipated to be completed by October 1983. Hamden has expressed an interest in an automated flood warning system for use on the Mill River, Belden Brook, and Farm Brook.

The Town reported that by June 1983, it had expended \$1.5 million in recovery costs. As of December 1983, FEMA had approved \$488,659 in reimbursable losses. An additional request for \$153,780 had not been acted on by FEMA. Most damages were to roads and bridges, and for reimbursement for time and materials during the emergency. In addition, the Department of Police Services suffered extensive flood damage and was being remodeled. FHWA provided \$182,698 for damages to local roads and bridges. The SCS conducted \$20,825 of emergency stream repairs on Belden Brook. DOH estimated 1,400 homes received minor damage, 400 had major damage and 3 were destroyed, at a cost of \$6,120,000. DED estimated losses to four businesses at about \$2,126,000. (18,35,40,41,49,52, 118)

KILLINGWORTH

Local officials monitored NWS forecasts and warnings throughout the June 4-6 weekend. The First Selectman, Civil Preparedness Director, and fire department officials patrolled floodprone areas throughout Saturday to assess flooding conditions and to blockade

roads deemed unsafe for travel. A few families were evacuated from the upper River Road area. Recovery operations on damaged Town roads began on Saturday by contractors.

Damages to public property in Killingworth were all to roads, bridges and culverts. Damages were caused by overbank flooding, high velocity waters, torrential runoff, and undersized and debris-blocked drains. The State bridge on Route 80 over the Menunketesuck River was completely washed out as were two Town bridges on Birch Mill and Paper Mill Roads. The Bunnell Bridge over the Hammonasset River was also damaged. Major roadway damage occurred on Reservoir Road, Old Deep River Turnpike, Lovers Lane, Hemlock Drive, and Emmanuel Church Road. Total costs approved by FEMA were \$198,407, including \$2,680 for emergency actions. All repairs had not been completed at the time of the interview in June 1983.

DOH and DED estimates did not include any housing or business damages for Killingworth, but OCP records showed Town officials estimated 1,400 homes received some damage at a cost of \$900,000, and ten businesses were damaged at a cost of \$10,000. (18,40,49,50,52,119,120)

LYME

No formal emergency plan was activated during the June floods. The First Selectman, a life-long resident of Lyme, was also the road foreman, and knew the areas that normally experienced flooding. He began to assess the flood situation on Saturday night by patrolling town roads.

FIGURE 6.7: FLOOD DAMAGES IN THE TOWN OF HAMDEN, STORM OF JUNE 4-7, 1982

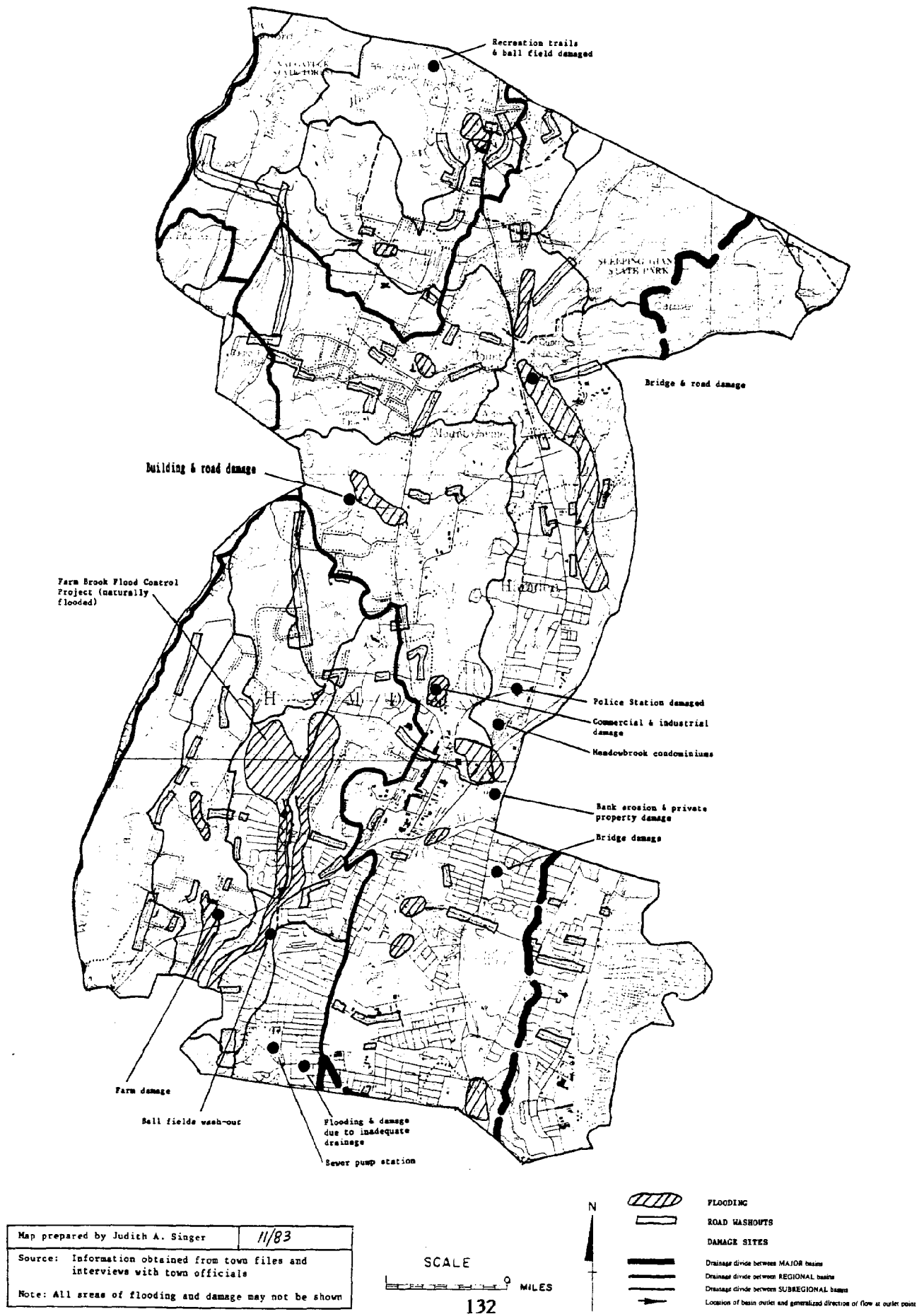
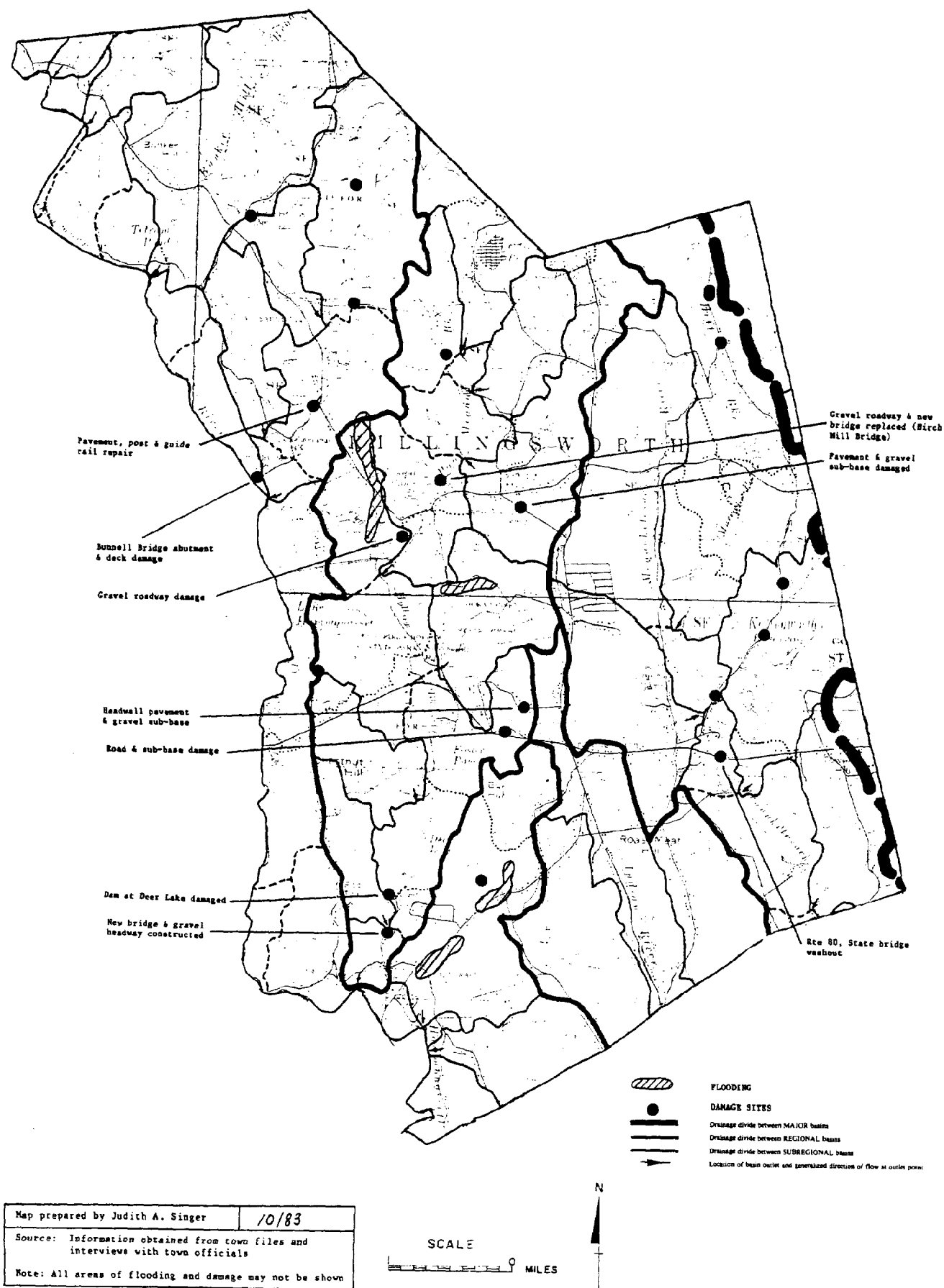


FIGURE 6.8: FLOOD DAMAGES IN THE TOWN OF KILLINGWORTH, STORM OF JUNE 4-7, 1982



Thirty volunteer firefighters worked throughout the weekend with rescues, evacuations and warnings to motorists. Volunteer firemen evacuated about 14 people from six houses, mainly in the Hadlyme area. One family refused to be evacuated. A Boston Whaler rescue boat was used by the fire department in an unsuccessful attempt to rescue a town resident along the Eight Mile River. The current was too deep and swift to enable the boat to maneuver through the flood waters. Two Lyme firemen closed off the Salem Bridge on Saturday night, and were themselves stranded through the night. One person died when the Town truck in which she was a passenger was swept away by Roaring Brook near State Route 82.

Despite the evacuations, DOH, DED, and OCP records all show no damages to homes and businesses in Lyme. The Town's major losses were to roads and bridges, and the loss of the Town truck. FEMA approved reimbursable flood losses for Lyme of \$181,993. The SCS conducted \$21,219 in emergency stream improvements on Joshua Creek. By April 1983, most recovery work was completed except for additional underpinning required for one road repair. (18,35,40,49,50,52,121)

MILFORD

As floodwaters began to rise in Milford on Saturday afternoon, City police established blockades at several bridges as a precautionary measure. After the downtown area was flooded, the Mayor declared a state of emergency and closed off the downtown area. More than 400 people were evacuated from Milford. Warnings were provided by use of a bull-horn, followed by a siren.

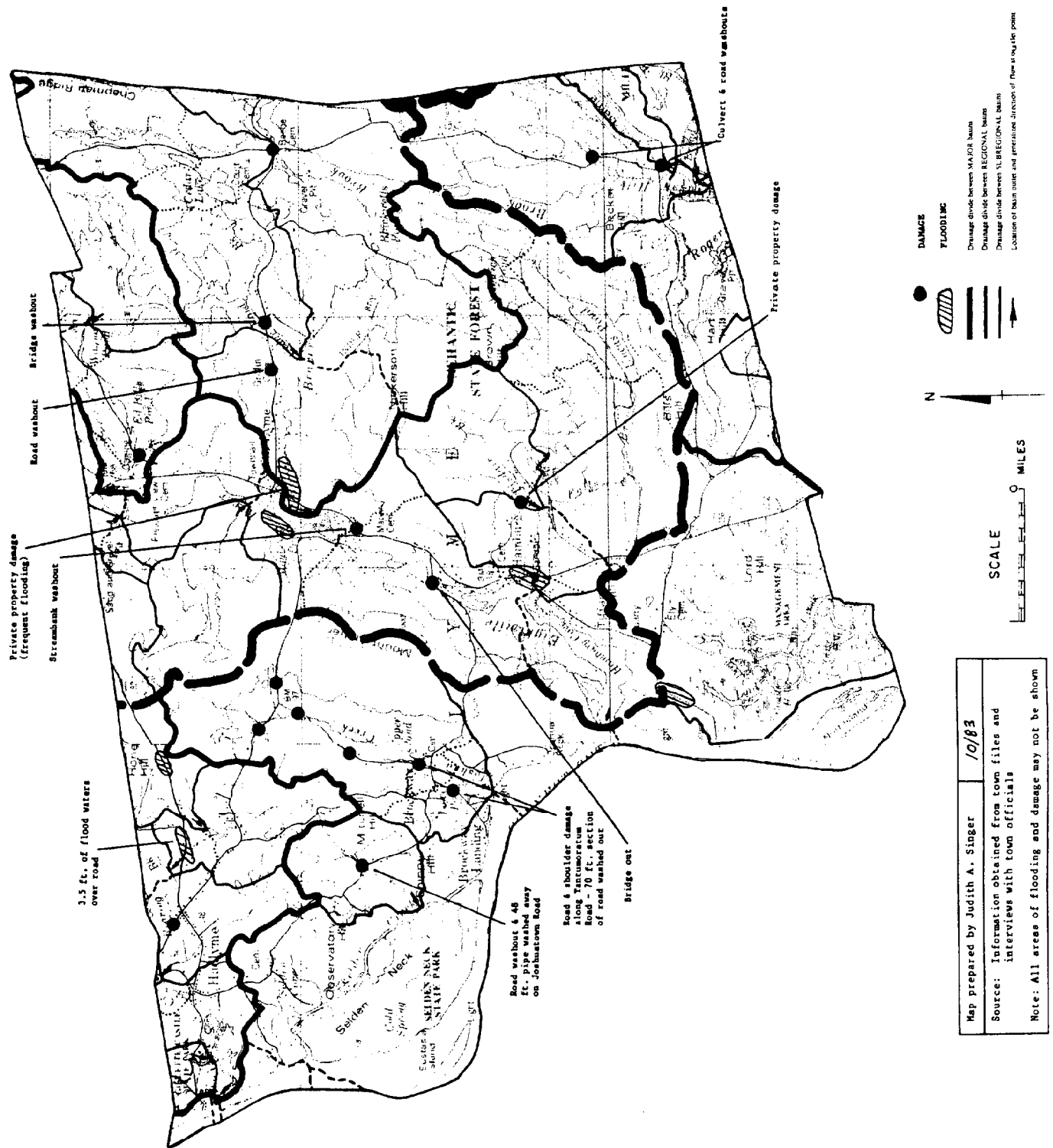
A previous incident in which two firemen lost their lives while attempting a rescue made the town sensitive to rescue efforts by emergency workers. The Senior Citizens Center was used as an emergency shelter, later supplemented by another shelter at Foran High School. Red Cross personnel helped operate the shelters.

Flooding in Milford was primarily from the Wepawaug River which runs through the center of town and the Indian River. The Wepawaug River caused extensive damages to businesses on Daniel and River streets, to the City Hall and library, a park north of City Hall, Milford Harbor, and to several bridges. The Indian River damaged two bridges and caused some business and residential damage. One person drowned in the Indian River. Most businesses reported that they did not have flood insurance.

The basement of City Hall was flooded almost to the ceiling. Furniture, equipment and records of government offices located in the basement were lost, including 34,000 bills for city taxes on motor vehicles which were ready for mailing. Fortunately, the tax records were stored on tape in the data processing department at another location. A basement wall cracked and the Fire Chief ordered power shut off and the building not to be used until its structural safety could be determined. The Mayor temporarily set up headquarters in police headquarters, and other city offices relocated to the old Central Grammar School gymnasium.

DOH estimated 540 homes in Milford with minor damage and 60 with major damage at a cost of \$3,900,000. DED estimated 57 businesses were damaged with losses of over \$9,730,000. Milford had approved damages by FEMA of about \$396,879, and as of December 1983 FEMA was still considering a request for

FIGURE 6.9: FLOOD DAMAGES IN THE TOWN OF LYME, STORM OF JUNE 4-7, 1982



an additional \$9,439. FHWA provided \$48,141 for repairs to local roads and bridges. Damages to the City Hall and Library were covered by a private insurance policy, and the town expected to be reimbursed almost \$500,000 in damages to the buildings and contents, including the cost of salvaging important land records and other documents. Several road and bridge repairs, repair of the dam behind City Hall and dredging of Milford Harbor were still pending in April 1983. (18,40,41,49,52,122,123)
(Also see pages 42 and 94.)

NAUGATUCK

Flooding in Naugatuck followed a much different pattern than the record floods of 1955. At that time the Naugatuck River caused massive destruction, and as a result of that flood, the Corps of Engineers constructed seven flood control projects and two local flood protection projects to control flooding on the Naugatuck. Although the Naugatuck River overflowed in June 1982, it did not present a major problem. Flood problems in June were caused by smaller tributaries to the Naugatuck River.

The Police Department coordinated emergency efforts during the flooding (Civil Preparedness is under the direction of the Police Chief). More than 100 people were evacuated from the southeast portion of Town after the Beacon Hill Brook overflowed and left only one passable bridge out of the area. Evacuations also occurred on Prospect Street in northeast Naugatuck when extensive basement flooding took place. Shelters were opened at the City Hill Middle School and at the Salem Lutheran Church, and were staffed by Red Cross and other volunteers. About 75 National Guardsmen

from the local post assisted with the distribution of some 7,000 sandbags to direct water away from essential streets.

The relatively steep topography of the area caused rapid runoff which resulted in widespread damage to roads and shoulders. FEMA approved \$218,079 in reimbursable flood losses, plus \$4,570 for the Naugatuck Housing Authority. Seven bridges were also damaged by the floods. Controversy over FEMA payment for replacement of these bridges ensued after the Mayor ordered the bridges removed and reconstruction begun before FEMA representatives had an opportunity to inspect them and determine the extent of damages caused by flooding. OPM worked with FEMA and the Town to try and reach an agreement on the amount of eligible damages. However, as of December 1983, FEMA had determined not to provide any financial assistance for the bridges, because the Town had not documented flood-related damages to FEMA's satisfaction. FHWA provided \$29,897 for damages to local roads and bridges. The SCS conducted \$509,504 in emergency stream improvements on Beacon Hill Brook, Fulling Mill Brook, Long Meadow Brook, and Bladen's River. As of August 1983, flood recovery was essentially complete, with only some blacktopping and landscaping work remaining. DOH estimated 360 homes received minor damage and 40 had major damage at a cost of \$2,600,000. DED records indicated only one business suffered damages with losses of about \$50,000. (18,35,40,41,124,125)

NORWICH

The City of Norwich is located in an extremely flood prone area. Three

FIGURE 6.10: FLOOD DAMAGES IN THE CITY OF MILFORD, STORM OF JUNE 4-7, 1982

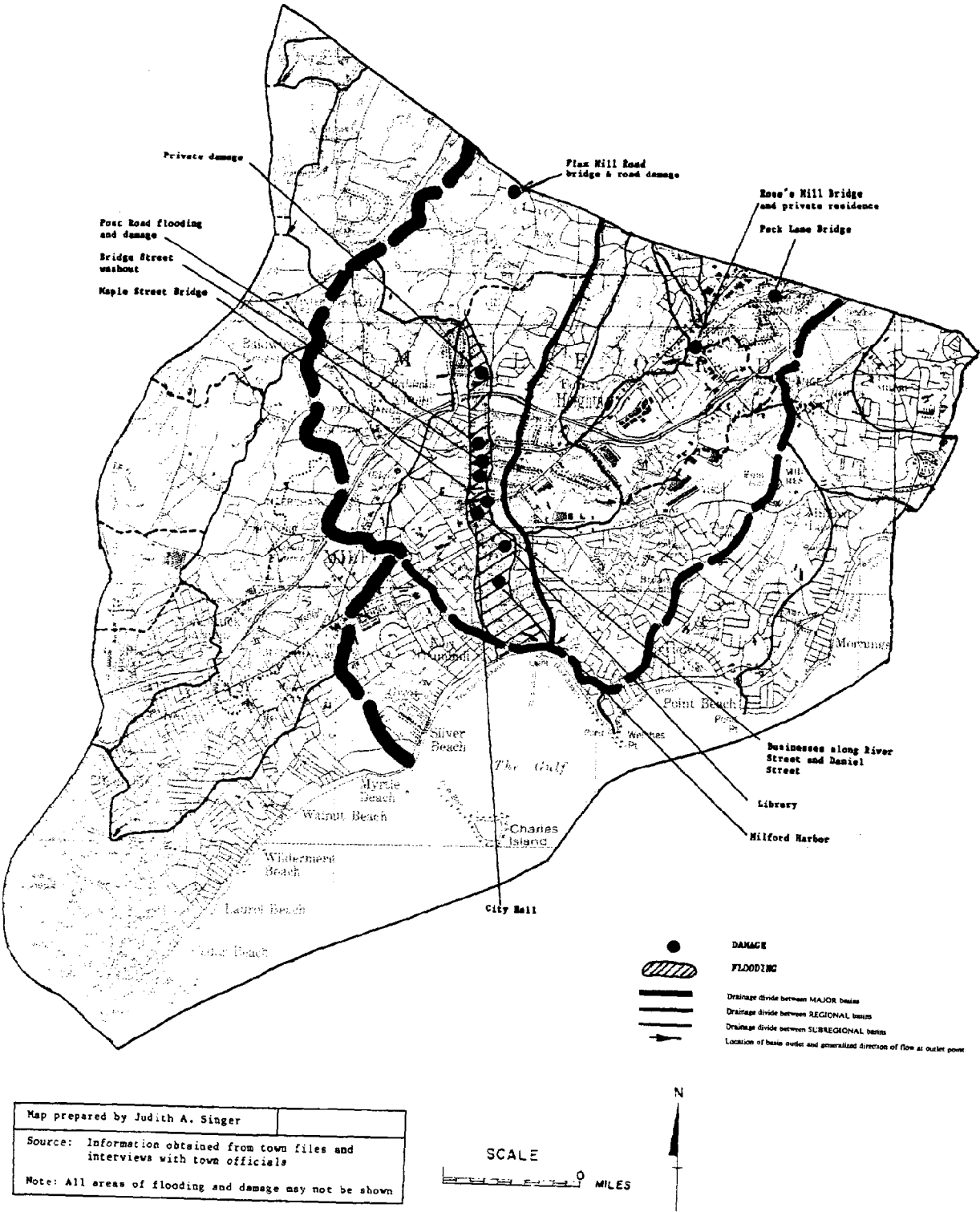
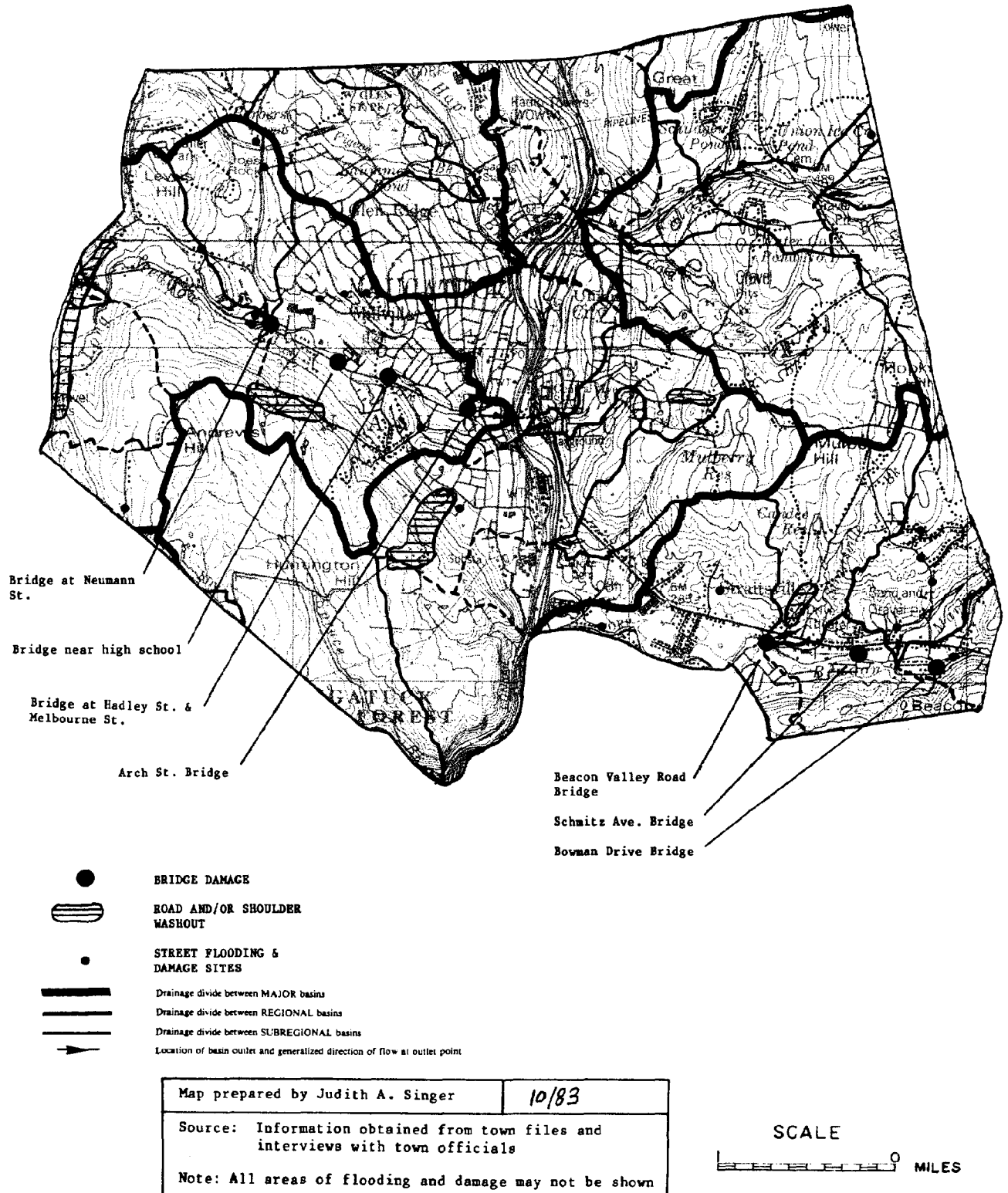


FIGURE 6.11: FLOOD DAMAGES IN THE TOWN OF NAUGATUCK, STORM OF JUNE 4-7, 1982



rivers -- Quinebaug, Yantic and Shetucket -- converge in Norwich to form the Thames River. Consequently, the City has a long history of flooding and is very conscious of flood potential.

Norwich has developed an active civil preparedness program, and at the time of the June floods, it had the only Self-Help flood warning system in the State. This system was activated on Friday morning after a call from NEREC alerting the Civil Preparedness Director to the possibility of weekend flooding. Local Town officials and residents and business owners in flood prone areas were notified on Friday of potential flooding over the weekend. By monitoring rainfall and river levels in the Yantic River and with the help of NEREC, the Norwich Civil Preparedness Office was able to make more specific forecasts of flood levels and time of flooding than other towns. Emergency broadcasts of flood warnings were made over local radio and TV stations. However, most residents and business owners did not believe that flood waters would exceed past levels, and their preparations were geared to previous experiences. Although some flood damages were prevented by sandbagging and removing or raising contents, many flood loss reduction efforts proved futile as flood waters exceeded previous levels.

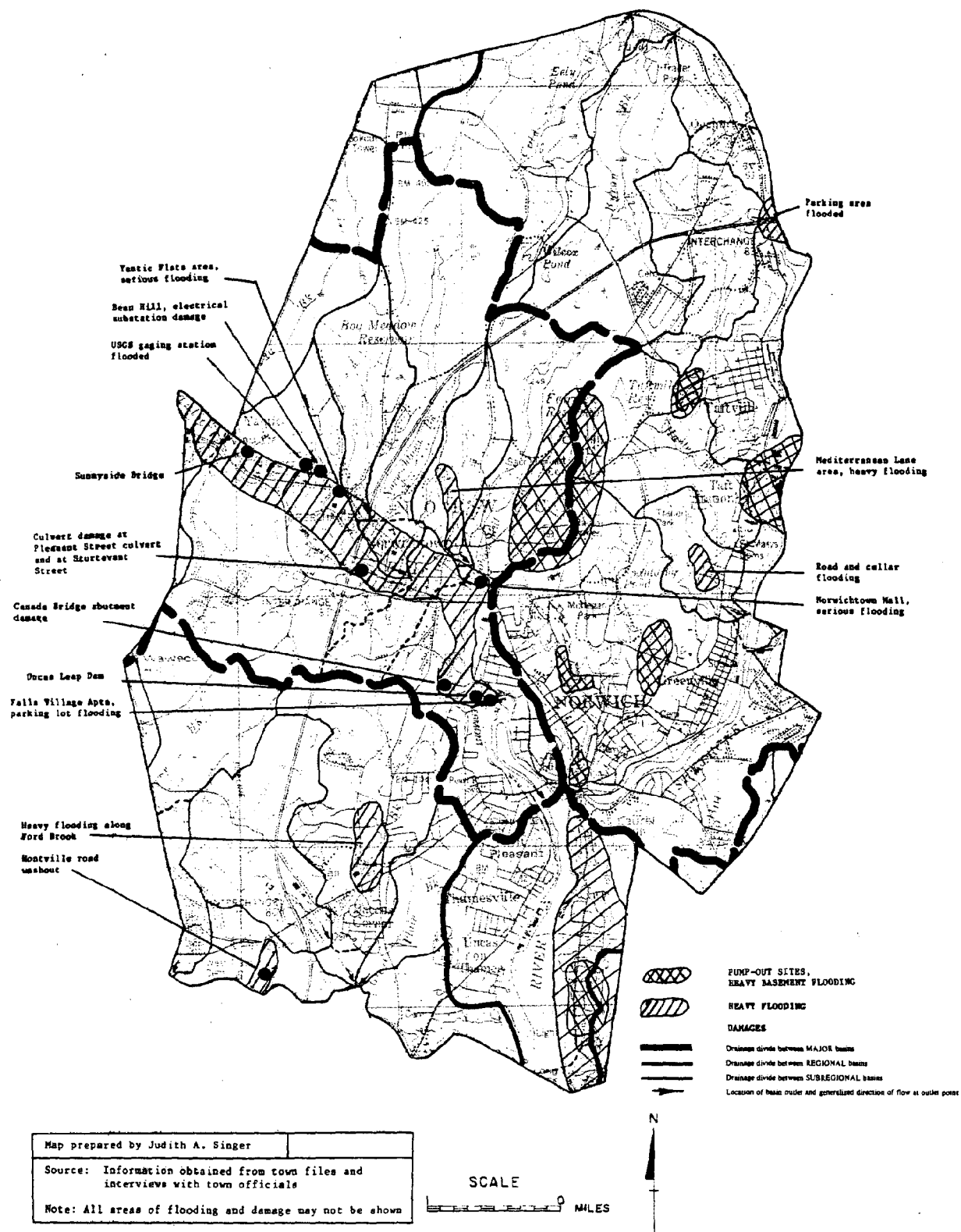
Beginning Saturday night, civil preparedness workers and about 50 National Guardsmen sandbagged areas along the Yantic River. By 1 am Sunday, 10,000 sandbags had been used. Over 100 people were evacuated from low lying areas. Using ten-wheel dump trucks, volunteer firemen and civil preparedness workers evacuated 75 to 100 people from the Sturtevant Street area which runs behind the Shop-Rite Mall. Another 30 to 40 people were evacuated from Falls Mills

Apartments when propane tanks began leaking. In the Taftville section, volunteer firemen went door-to-door warning residents of the possibility of damage to or failure of the Hopeville Dam. Six trapped families in the Sturtevant Street area were evacuated by boat during a dramatic three-hour rescue. Another two men, trapped in an auto-parts store in the Yantic Flats area, were rescued by a ten-wheel dump truck. A Red Cross center was established in the John Moriarity School, and the Salvation Army also set up an emergency shelter.

Many businesses in Norwich received damages. Most of these were concentrated in three locations along the Yantic River: the Shop-Rite shopping center, Yantic Flats, and the Norwichtown Mall and businesses across the river from the Mall. DED estimated 51 businesses were damaged with total losses of about \$2,596,000. Residential damage was heavy in the Sturtevant Street area behind the Shop-Rite center. DOH estimated 140 homes sustained minor damages and 30 major damages at a cost of \$1,000,000. Serious damage also occurred to the Town owned Uncas Leap Dam and to the Yantic Fire Station.

FEMA approved \$91,680 in eligible City flood losses, and a supplemental request of \$8,523 was pending as of December 1983. FHWA provided \$8,270 for repair of two bridges over the Yantic River. Since the June floods, Norwich has installed two of a planned series of sirens with public address capabilities, added more volunteers to its rainfall data collection network, and expressed interest in an automated flood warning system. (12,15,18,40,41,49,52,126) (Also see page 22.)

FIGURE 6.12: FLOOD DAMAGES IN THE CITY OF NORWICH, STORM OF JUNE 4-7, 1982



WOODBIDGE

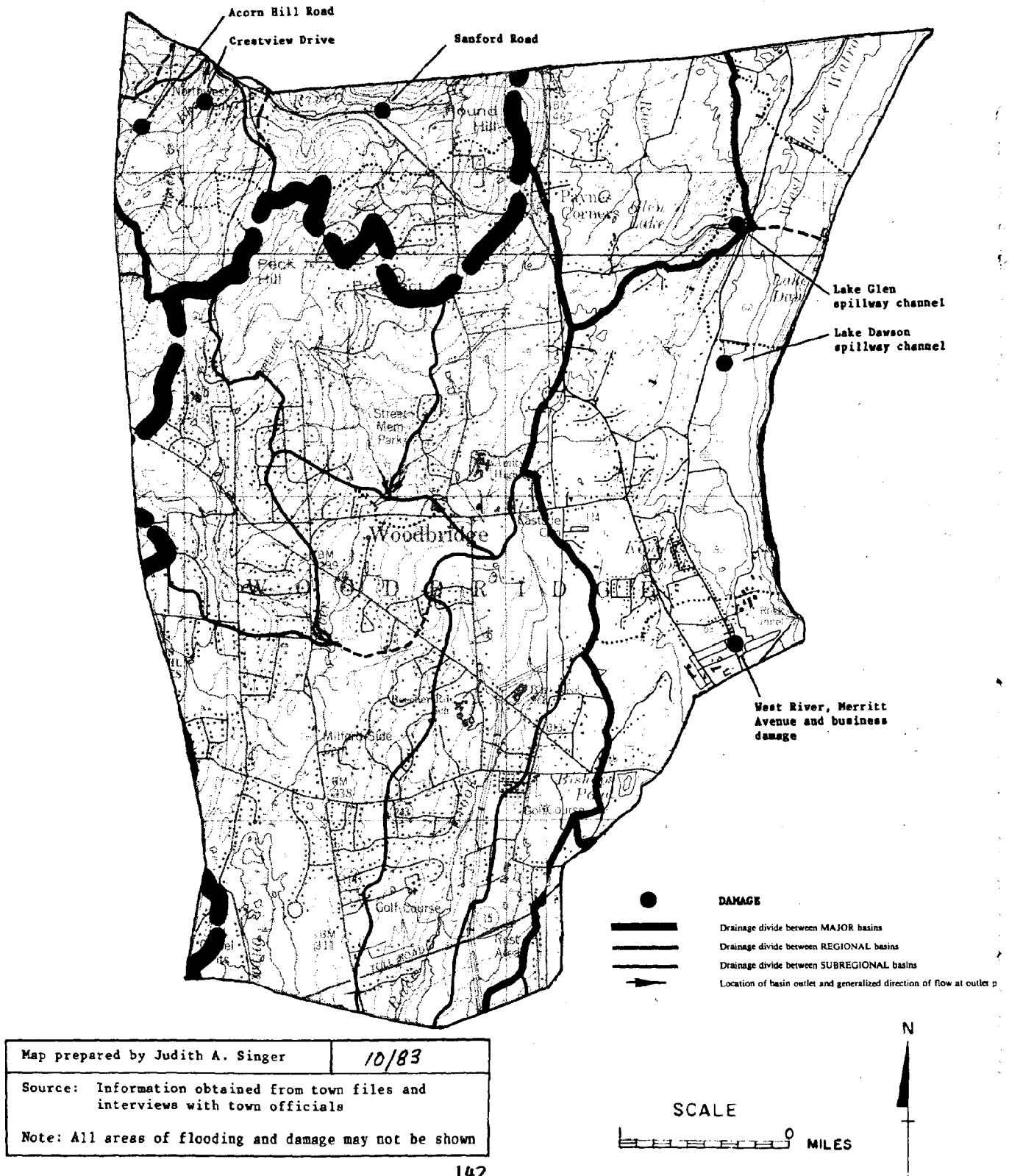
Emergency activities in Woodbridge began about 10 am on Saturday. The local Civil Defense Director and First Selectman directed efforts of the volunteer firemen and public works department, who remained on duty until Sunday morning. The Police Department patrolled the area and set up barricades on impassable roads.

Approximately 70 residents plus a few transients were evacuated. Officials noted some resistance to evacuation and rescue efforts. The Police Station and the Senior Center, located in central Town Hall area, were used as shelters. Twenty people used the shelters Saturday night, while other evacuees stayed with friends and relatives.

Town officials noted the lack of a special warning system for flood emergencies and felt that one was needed. During the storm, some of the Town's communication radios were submerged. Officials were aware of the availability of sandbags from OCP, but felt they would be of limited value. During the storm, the South Central Connecticut Regional Water Authority closely monitored three local reservoirs. The dams and spillways were inspected during and after the storm, and water level measurements were taken in the spillways, but water authority personnel noted some difficulty in taking lake level measurements in the customary places. As a result, they planned to designate alternate locations for taking lake level measurements during storms and installing automatic lake level reading devices. They also planned to explore the possibility of obtaining surplus amphibious vehicles in order to navigate inundated roadways during storms.

Reservoir properties of the South Central Connecticut Regional Water Authority located in Woodbridge sustained the most severe damage of all their land holdings. Major damages were to Lake Dawson and Lake Glen spillway channels. DOH records indicated no damages to houses in Woodbridge, but OCP records indicated Town officials estimated 40 homes were damaged at a cost of \$20,000. DED estimated 12 businesses were damaged with losses of about \$908,000. Town files contained damage statements from nine homeowners and ten businesses. Damage to Town property was relatively modest, mostly to roads and bridges. FEMA approved \$32,427 in flood losses. By May 1983, all flood repairs had been completed. (18,40,49,50,52,127,128)

FIGURE 6.13: FLOOD DAMAGES IN THE TOWN OF WOODBRIDGE, STORM OF JUNE 4-7, 1981



APPENDIX A

REFERENCES AND FOOTNOTES

REFERENCES

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- 2 Water Resources Conditions in Connecticut, June 1982. U.S. Geological Survey, Hartford, CT.
- 3 Weather Bureau Technical Papers No. 40 and 49. National Weather Service.
- 4 Personal communication with David Curtis, Flash Flood Hydrologist, NERFC, Bloomfield, CT, 1/31/83 and subsequent.
- 5 Personal communication with Tod Mendell, Hydrologist, NERFC, Bloomfield, CT, 9/15/83 and subsequent.
- 6 Personal communication with Bruce Whyte, Hydrologist, NERFC, Bloomfield, CT, 9/8/83.
- 7 Personal communication with Charles Smith, Hydrologist In Charge, NERFC, CT, 12/1/83 and subsequent.
- 8 State of Connecticut Emergency Operations Plan: Annex A-2, State Warning Plan. CT Office of Civil Preparedness, June 30, 1982.
- 9 Personal communication with Sgt. Gerald Bennett, CT State Police, Meriden, CT, 8/30/83.
- 10 Personal communication with Frank Grandone, Operations Officer, CT Office of Civil Preparedness, Hartford, CT, 5/10/83.
- 11 Interdepartment Message from Frank Mancuso, State Director, CT Office of Civil Preparedness, to Hugo Thomas, Director, CT, DEP, Natural Resources Center, 12/22/83.
- 12 Personal communication with Rita Frechette, Norwich Civil Preparedness Director, Norwich, CT, 8/22/83.
- 13 State of Connecticut Emergency Operations Plan: Appendix 8, Connecticut Warning Fanout. CT Office of Civil Preparedness, June 1982.
- 14 Interviews with numerous town officials.
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- 16 Personal communication with Paul Gibb, CT Office of Civil Preparedness, Hartford, CT, 6/3/83 and subsequent.
- 17 Personal communication with Stuart Mahler, Local Government Program Supervisor, CT Office of Policy and Management, Hartford, CT, 6/1/83 and subsequent.
- 18 Various newspaper articles.
- 19 Personal communication with George L. Larned, Transportation Associate Engineer, CT Dept. of Transportation, Bureau of Highways, Wethersfield, CT, 8/30/83 and subsequent.

- 20 Various press releases from the Governor's office and various newspaper articles.
- 21 Personal communication with Charles Berger, Jr., Senior Engineer, CT DEP, Water Resources Unit, Hartford, CT, 9/5/83 and subsequent.
- 22 Personal communication with Roy Frederickson and Wes Winterbottom, CT DEP, Water Compliance Unit, Hartford, CT, 8/31/83 and subsequent.
- 23 Personal communication with Ray Jarema, CT Dept. of Health Services, Hartford, CT, 8/29/83.
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- 25 Corps of Engineers reports on inspection of Connecticut dams, from DEP Water Resources Unit files, 6/83.
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- 28 Personal communication with Graham Waldron and Daniel Vece, CT Dept. of Economic Development, Hartford, 5/10/83 and subsequent.
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- 32 Yankee Clippings, Vol 6, No. 2, Summer, 1982. The Salvation Army, Southern New England Division, Hartford, CT.
- 33 "TV Helicopter Rescues Two Men from River", The Milford Citizen, June 7, 1982.
- 34 "Westport Girl is Rescued After Falling into Torrent", The Norwalk Hour, June 8, 1982.
- 35 Personal communication with Phillip Renn, Water Resources Coordinator, Soil Conservation Service, Storrs, CT, 3/29/83 and subsequent.
- 36 Review of Flood Evacuation Efforts in Essex, Connecticut, June 1982. Dr. Toby Kircher, et. al., CT Dept. of Health Services, Epidemiology Section, undated.
- 37 Governor's Office Press Release, 2 pm, June 9, 1982.
- 38 Letter to the President from Governor William O'Neill, requesting a major disaster declaration for the State of Connecticut, June 10, 1982.
- 39 Age, Sex, Location, and Circumstances of Flood-related Deaths in Connecticut, June 1982. Toby Kircher, EIS Officer, CT Dept. of Health Services, Hartford, undated (1983).
- 40 Listing of status of local and State requests for financial assistance, from Stuart Mahler, CT Office of Policy and Management, 12/31/83.

- 41 Summary of Damage Survey Reports for the FHWA Emergency Repair Program, provided by Richard J. Haley, Engineer of Traffic, CT DOT, Bureau of Highways, 10/19/83 and subsequent.
- 42 Personal communication with Louis Semento, Purchasing Agent, City of Milford, 12/1/83.
- 43 Damage Survey Reports for CT Dept. of Transportation, CT Office of Policy and Management, Hartford, 12/83.
- 44 Damage Survey Reports for CT Dept. of Environmental Protection, CT Office of Policy and Management, Hartford, 9/83.
- 45 Personal communication with Brian Emerick, CT Dept. of Environmental Protection, Hartford, 11/30/83.
- 46 Personal communication with Mark Ruett and Dave Schreiber, U.S. Agricultural Stabilization and Conservation Service, Hartford, 1/17/83 and subsequent.
- 47 Damage Survey Reports for various State agencies, CT Office of Policy and Management, Hartford, 9/83.
- 48 Personal communication with James Barber, Manager of State and Community Affairs, Amtrak, Washington, D.C., 11/3/83.
- 49 "Damage Estimates for Flood - Housing Only", CT Dept. of Housing, June 1982, obtained from CT DEP, Natural Resources Center.
- 50 Summaries of reported flood damages, by counties, CT Office of Civil Preparedness, Hartford, 6/9/82.
- 51 Letter from John J. Carson, Commissioner, CT DED, to Governor William O'Neill, 6/10/82.
- 52 Summaries of estimated business losses, by counties and towns, CT Dept. of Economic Development files, Hartford, 6/10/82.
- 53 Personal communication with Robert Valentine, Facilities Manager, Times Fiber Communications, Inc., Wallingford, CT, 9/13/83.
- 54 Personal communication with local beverage supplier.
- 55 Damage Survey Reports for nonprofit organizations, CT Office of Policy and Management, Hartford, 9/83.
- 56 Personal communication with Kenneth Kells, Connecticut Water Company, Clinton, 8/4/83 and subsequent.
- 57 Personal communication with Walter Barker, Superintendent of Transmission and Distribution, United Illuminating, New Haven, CT, 2/1/84.
- 58 Personal communication with Dennis Polio, Northeast Utilities, Hartford, CT, 1/23/84.
- 59 Personal communication with Mike Gomez, SNET, New Haven, CT, 1/31/84.
- 60 Personal communication with Victor Galgowski and Wesley Marsh, CT DEP, Water Resources Unit, Hartford, 8/31/83 and subsequent.
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- 63 News Release, "Record \$236.3 Million Saved by Corps Flood Control Projects." Corps of Engineers, New England Division, Waltham, MA, 10/22/82.
- 64 Memorandum "Supplement to Reservoir Regulation Bulletin 82-6," from Chief, Water Control Branch to Chief, Engineering Division, Corps of Engineers, New England Division, Waltham MA, 8/5/82.
- 65 Letter from Governor O'Neill to David Sparks, Regional Director, FEMA, Boston, 6/22/82.
- 66 Letter from David Sparks, Regional Director, FEMA, Region I, Boston, to Governor William O'Neill, 7/8/82.
- 67 Various news releases from FEMA, OCP, and the Governor's office.
- 68 Personal communication with Sandra Pratt, CT Dept. of Income Maintenance, Hartford, 5/13/83 and subsequent.
- 69 Governor's Office News Release, 6/18/82.
- 70 Governor's Office News Release, 6/24/82.
- 71 Connecticut Public Act 82-1 (June Session), July 1982.
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- 72 "State of Connecticut Administrative Plan, Temporary Housing Program", undated.
- 73 Personal communication with James Silk and Ms. Donahue, FEMA, Disaster Assistance Program, Region I, Boston, 3/8/83 and subsequent.
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- 75 "Final Statistical Report", State of CT, Individual and Family Grant Program, 8/23/83.
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- 77 Personal communication with Carl Jordan, Small Business Administration, Fair Lawn, NJ, 3/30/83 and subsequent.
- 78 Personal communication with James Conklin, Supervisor of Mortgage Finance Section, CT Dept. of Housing, 10/20/83.
- 79 Personal communication with Roger Therrien, Research Analyst, Office of Research Information, CT Dept. of Labor, Hartford, 9/9/83 and subsequent.
- 80 Personal communication with Dr. Joseph Torres, Project H₂O Director and Regional Director, CT Dept. of Mental Health, Region III, Norwich, 6/10/83 and subsequent.
- 81 Personal communication with Mike Rosono, CT Dept. on Aging, Hartford, 8/26/83.
- 82 Personal communication with Brian Day, Loan Officer, CT Development Authority, Hartford, 9/9/83 and subsequent.
- 83 Personal communication with Daniel Cash, District Director, Federal Crop Insurance Corp., Willimantic, CT, 9/16/83 and subsequent.
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- 88 Personal communication with Kevin Merli, FEMA, Region I, Boston, MA, 9/9/83.
- 89 Personal communication with William Gilluly, Property Claim Services, Rahway, NJ, 11/2/83.
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- 107 Personal communication with Stan Humphries, FEMA, Region I, Boston, 10/7/83.
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- 109 Project H₂O: Help to Others in Connecticut, Final Report, 1983. Dr. Joseph M. Torres, et al.
- 110 Personal communication with Robert J. Blair, First Selectman, Chester, 4/19/83.
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- 112 Personal communication with Joseph Mizejeski, First Selectman, and Russell B. McNutt, Consulting Engineer, Deep River, 5/19/83.
- 113 Personal communication with Richard Riggio, First Selectman, Essex, 4/26/83.
- 114 Personal communication with Fred Radcliffe and William Veillette, Consulting Engineers, Essex, 7/26/83.
- 115 Personal communication with Allan Bergren, Chief Administrative Officer, and Bob Drewry, Foreman of Roads, East Hampton, 8/11/83.
- 116 Personal communication with Mark P. Lundgren, First Selectman, Haddam, 4/26/83.
- 117 Personal communication with Thomas E. Metcalf, Town Engineer, Haddam, 6/29/83.
- 118 Personal communication with Walter T. MacDowell, Director of Civil Preparedness & Emergency Medical Services, Hamden, 4/7/83 and subsequent.
- 119 Personal communication with Horace E. Bruce, First Selectman, Killingworth, 4/12/83.
- 120 Personal communication with Bernard H. Roth, Chairman, Inland Wetlands & Watercourses Commission, Killingworth, 7/25/83 and subsequent.
- 121 Personal communication with Chauncey H. Eno, First Selectman, Lyme, 4/29/83.
- 122 Personal communication with John K. Donnelly, Public Works Director, Milford, 4/4/83.
- 123 Personal communication with John R. Casey, City Engineer, and Leon Dolenski, Engineering Dept., Milford, 7/7/83.
- 124 Personal communication with Frank Rucci, Civil Preparedness Director, Mike Kelly, Superintendent of Public Works, and Frank Shea, Parks and Recreation, Naugatuck, 8/3/83.
- 125 Personal communication with James Donovan, FEMA Region I, Boston, MA, 1/3/84.
- 126 Personal communication with Steve J. Garstka, City Engineer, Norwich, and Stephen Caisse, Fire Chief, Taftville Fire Department, 8/15/83.
- 127 Personal communication with Russell B. Stoddard, First Selectman, Joseph Kalson, Public Works Director, and Curt L'Hommedieu, Civil Defense Director, Woodbridge, 5/26/83.
- 128 Personal communication with Jack Reynolds and Peter Gaewski, South Central Regional Water Authority, 8/24/83.

FOOTNOTES

- 1 An earlier version of this rainfall distribution map, based on initial rainfall reports and fewer stations, was prepared by the USGS shortly after the storm and has been used in previous reports by USGS and other agencies.
- 2 An earlier version of this peak flow map, based on preliminary measurements of discharge, was prepared by the USGS shortly after the storm and has been used in previous reports by USGS and other agencies.
- 3 The NERFC does not normally have a staff hydrologist on duty at the center between 12:00 midnight and 6:00 am. The duty hydrologist was notified at his home and reported immediately to the NERFC offices.
- 4 Volunteer observers are requested to call in reports every six hours (7am, 1pm, 7pm, 1am) when rainfall exceeds a certain amount, but reports are not always made for every time period. The 1 am report is often not made. (4)
- 5 \$800,000 is a minimum amount determined by reviewing an OPM summary of applications and approvals. The total difference between loss reimbursement requested and losses approved by FEMA cannot be determined without a detailed review of all applications and supplemental applications. Many supplemental applications include a request for and additional justification for previously denied funds.
- 6 Some towns reported only a dollar amount of estimated damages and no number of businesses damaged.
- 7 DED was provided information on businesses with losses identified during preparation of this report and not found in DED files. DED planned to contact these businesses as part of its program of providing disaster assistance (see Chapter 5).
- 8 FEMA reported that \$319,072 in Disaster Unemployment Assistance had been paid (73). The reason for the difference between FEMA and DOL figures was not determined.
- 9 FEMA indicated that these claims covered all flooding in CT in 1982, and that probably 99 percent were from the June floods. Some claims may still be outstanding and will be added to the total. (88)
10. Salem joined the NFIP in July 1983. Its participation was scheduled prior to June 1982, but the Town rejected the program. After the floods, when the Town realized that no disaster loans would be available, it voted to join the NFIP. (21)
- 11 In 1983 the tax codes were revised to make casualty losses deductible only if they exceeded 10 percent of adjusted gross income. A \$100 deductible still applies. (92)

- 12 Study limitations prevented interviews with every town official who could have contributed useful information. Generally, the one or more individuals recommended by the chief elected official were interviewed. Often this was only one person, who did not have all the information desired for this report. Information that may have been available from other individuals within the town was frequently not obtained.
- 13 Few police and fire officials were interviewed. Local police and fire offices may have received NWS warnings through NAWAS, NOAA Weather Radio, and OCP, State Police or county fire fanouts, but those officials interviewed generally did not mention this type of warning.

APPENDIX B

U.S. GEOLOGICAL SURVEY GAGING STATIONS

RECORDINGS OF PEAK FLOWS, JUNE 1982

STATION	MAXIMUM DISCHARGE (Ft ³ /s) / GAGE HEIGHT (Ft)		
	June 1982	Prior to June 1982	
		Period of Record (earliest record ¹)	Outside Period of Record
<u>PAWCATUCK RIVER BASIN</u>			
Pendleton Hill Brook near Clarks Falls (01118300)	6,480 / 6.73* 6/5/82	24,200 / 18.66 1/21/79 (1958)	
<u>MYSTIC RIVER BASIN</u>			
Haleys Brook near Old Mystic ² (01118750)	720 / 5.23* 6/5/82	300 / 4.23 1/25/79 (1962)	
<u>THAMES RIVER BASIN</u>			
Roaring Brook near Staffordville ² (01119300)	920 / 4.56* 6/5/82	680 / 4.23 1/25/79 (1960)	
Conat Brook at West Willington ² (01119360)	138 / 4.76 6/5/82	150 / 4.92 1/25/79 (1964)	
Willimantic River near Coventry (01119500)	6,480 / 11.64 6/6/82	24,200 / 18.66 8/19/55 (1931)	
Hop River near Columbia ² (01120000)	6,940 / 16.72* 6/6/82	6,450 / 16.25 9/21/38 (1933)	
Mount Hope River near Warrenville (01121000)	2,720 / 8.85 6/6/82	5,590 / 10.41 8/19/55 (1940)	- / 14.5 9/38
Natchaug River at Willimantic (01122000)	2,710 / 7.83 6/10/82	32,000 / 16.39 9/21/38 (1930)	
Shetucket River near Willimantic (01122500)	15,400 / 14.72 6/6/82	52,200 / 27.6 9/21/38 (1928)	
Merrick Brook near Scotland ² (01122680)	1,020 / 4.88* 6/5/82	850 / 4.60 4/2/70 (1964)	
Little River near Hanover (01123000)	2,450 / 8.31* 6/6/82	2,080 / 7.72 1/26/78 (1951)	
Quinebaug River at Quinebaug (01123000)	3,010 / 6.71 6/6/82	49,300 / 18.96 8/19/55 (1931)	
Quinebaug River at West Thompson (01124151)	2,270 / 6.57 6/10/82	2,690 / 6.99 1/29/79 (1966)	48,200 / 20.1 8/19/55
English Neighborhood Brook at ² North Woodstock (01125300)	1,200 / 7.55* 6/5/82	580 / 5.54 1/26/78 (1962)	
Muddy Brook at Childs Hill Road near Woodstock (01125415)	1,330 / 7.51 6/6/82	1,030 / 6.90 1/25/79 (1979)	2,520 - 3/19/36

STATION	MAXIMUM DISCHARGE (Ft ³ /s) / GAGE HEIGHT (Ft)		
	June 1982	Prior to June 1982	
		Period of Record (earliest record ¹)	Outside Period of Record
Fivemile River at Killingly ² (01126000)	1,380 / 6.16 6/6/82	2,480 / 8.52 7/24/38 (1938)	
Moosup River at Moosup ² (01126500)	3,040 / 7.12 6/6/82	4,260 / 8.35 3/12/36 (1933)	
Quinebaug River at Jewett City (01127000)	17,400 / 19.13 6/6/82	40,700 / 29.0 8/20/55 (1918)	
Yantic River at Yantic (01127500)	12,000 / 14.88 6/6/82	13,500 / 14.66 8/20/55 (1930)	
<u>FOURMILE RIVER BASIN</u>			
Fourmile River near East Lyme ² (01127800)	1,280 / 9.24* 6/5/82	186 / 4.28 1/21/79 (1961)	
<u>CONNECTICUT RIVER BASIN</u>			
Freshwater Brook near Enfield ² (01183993)	450 / 4.60 6/6/82	- - (1980)	3,500 / - 8/19/55
Freshwater Brook at Enfield (01183994)	575 / 5.05 6/6/82	600 / - 2/20/81 (1980)	
Connecticut River at Thompsonville (01184000)	64,500 / - 6/7/82	282,000 / 16.6 3/20/36 (1928)	
Namerick Brook near Warehouse Point ² (01184260)	500 / 5.49 6/5/82	620 / 5.92 12/21/73 (1964)	
Gillette Brook at Somers ² (01184300)	290 / 5.58 6/5/82	620 / 5.92 9/27/75 (1960)	
Stony Brook near West Suffield (01184100)	1,280 / 5.83 6/6/82	830 / 4.82 9/27/75 (1960)	
Scantic River at Broad Brook ² (01184500)	1,780 / 9.97 6/7/82	13,300 / 19.9 8/19/55 (1929)	
West Branch Farmington River at Riverton (01186000)	473 / - 6/6/82	10,600 / 12.47 10/16/55 (1955)	
Still River at Robertsville (01186500)	4,110 / 7.57 6/5/82	44,000 / 16.48 8/19/55 (1948)	
Hubbard River near West Hartland (01187300)	1,480 / 7.25 6/5/82	10,500 / 16.5 8/19/55 (1938)	
Nepaug River near Nepaug ² (01187800)	1,890 / 6.55 6/6/82	10,000 / - 8/19/55 (1922)	

STATION	MAXIMUM DISCHARGE (Ft ³ /s) / GAGE HEIGHT (Ft)		
	June 1982	Prior to June 1982	
		Period of Record (earliest record ¹)	Outside Period of Record
Burlington Brook near Burlington (01188000)	672 / 7.86 6/5/82	1,690 / 9.22 8/19/55 (1931)	
Farmington River at Unionville (01188090)	12,800 / 13.85 6/6/82	- / - - (1977)	140,000 / 32.9 8/19/55
Roaring Brook at Unionville ² (01188100)	900 / 3.14* 6/5/82	570 / 2.66 2/2/73 (1962)	
Pequabuck River at Forestville (01189000)	4,990 / 9.88 6/5/82	11,700 / 13.22 8/19/55 (1941)	
Stratton Brook near Simebury ² (01189200)	390 / 4.01* 6/5/82	290 / 3.30 1/25/79 (1964)	
Farmington River at Tariffville (01189995)	14,500 / 10.49 6/7/82	29,900 / 14.0 9/22/38 (1913)	
Farmington River at Rainbow (01190000)	19,600 / 11.70 6/7/82	69,200 / 23.5 8/19/55 (1928)	
Connecticut River at Hartford (01190070)	- / 19.65 6/7/82	313,000 / 37.05 3/20/36 (1905)	
Piper Brook at New Britain (01190095)	656 / 4.45* 6/8/82	300 / - 2/20/81 (1980)	
Piper Brook at Newington Junction ² (01190100)	1,750 / 9.96 6/5/82	2,400 / 11.62 10/3/79 (1959)	
Mill Brook at Newington ² (01190200)	192 / 4.77 6/5/82	460 / 6.70 9/12/60 (1959)	
North Branch Park River at Hartford (01191000)	3,270 / 11.86 6/6/82	10,000 / 18.8 8/19/55 (1936)	
Charter Brook near Crystal Lake ² (01191900)	340 / 4.32 6/5/82	600 / 4.52 12/21/73 (1965)	
Hop Brook at Manchester (01192480)	982 / 6.08 6/6/82	1,380 / 6.97 1/25/79 (1977)	
Hockanum River near East Hartford (01192500)	2,680 / 10.85 6/6/82	5,160 / 13.78 9/21/38 (1919)	
Shultz Pond Brook at New Britain ² (01192690)	135 / 2.78 6/5/82	- - (1980)	250 / - 8/19/55
Mason Pond Brook at New Britain ² (01192691)	415 / 9.66 6/5/82	112 / 2.63 3/3/72 (1971)	600 / - 8/19/55

STATION	MAXIMUM DISCHARGE (Ft ³ /s) / GAGE HEIGHT (Ft)		
	June 1982	Prior to June 1982	
		Period of Record (earliest record ¹)	Outside Period of Record
Willow Brook at New Britain (01192692)	1,100 / 5.90 6/6/82	850 / - 2/20/81 (1971)	1,500 / - 8/19/55
Parmalee Brook near Durham ² (01192800)	517 / 5.76 6/5/82	517 / 5.76 1/21/79 (1960)	
Coginchaug River at Middlefield (01192883)	2,110 / 12.23* 6/6/82	1,960 / 6.27 1/25/79 (1961)	
Connecticut River near Middletown (01193000)	94,200 / 11.52 6/7/82	177,000 / 30.44 8/20/55 (1947)	267,000 / 38.20 3/21/36
Blackledge River near Gilead ² (01193300)	480 / 5.66* 6/5/82	410 / 5.29 1/25/79 (1960)	
Salmon River near East Hampton (01193500)	18,500 / 14.40 6/6/82	12,900 / 12.67 1/25/79 (1928)	
Eightmile River at North Plain ² (01194000)	5,800 / 11.12* 6/6/82	2,730 / 8.24 1/21/79 (1938)	
<u>INDIAN RIVER BASIN</u>			
Indian River near Clinton (01195100)	2,600 / 8.29 6/6/82	- / - - (1981)	
<u>QUINNIPIAC RIVER BASIN</u>			
Harbor Brook at Westfield Road at Meriden (01196250)	743 / 6.71 6/5/82	1,190 / 5.72 5/16/81 (1980)	1,180 / - 1/25/79
Harbor Brook at Meriden (01196259)	1,350 / 6.40 6/6/82	933 / 5.11 7/29/80 (1980)	1,880 / 8.29 1/25/79
Quinnipiac River at Wallingford (01196500)	8,200 / 14.02* 6/6/82	5,580 / 12.93 1/25/79 (1930)	
<u>MILL RIVER BASIN</u>			
Mill River near Hamden (01196620)	5,580 / 9.53 6/6/82	3,180 / 5.65 1/29/79 (1968)	
<u>WEPAWAUG RIVER BASIN</u>			
Wepawaug River at Milford ² (01196700)	5,020 / 9.89* 6/6/82	1,600 / 7.24 1/21/79 (1962)	
<u>HOUSATONIC RIVER BASIN</u>			
Housatonic River at Falls Village (01199000)	4,070 / 5.97 6/6/82	23,900 / 19.4 1/1/49 (1912)	

STATION	MAXIMUM DISCHARGE (Ft ³ /s) / GAGE HEIGHT (Ft)		
	June 1982	Prior to June 1982	
		Period of Record (earliest record ¹)	Outside Period of Record
Salmon Creek at Lime Rock (01199050)	302 / 4.08 6/6/82	1,840 / 5.90 3/6/79 (1961)	6,300 / 13.5 8/19/55
Tenmile River near Gaylordsville (01200000)	2,970 / 6.10 6/7/82	17,400 / 14.90 8/19/55 (1929)	
Housatonic River at Gaylordsville (01200500)	8,050 / 7.82 6/7/82	37,000 / 14.5 9/22/38 (1900)	
Still River at Lanesville ² (01201510)	2,240 / 6.28 6/6/82	7,890 / 14.11 10/16/55 (1932)	
Butternut Brook near Litchfield ² (01202700)	860 / 6.26 6/5/82	630 / 7.91 2/2/73 (1960)	
Shepaug River near Roxbury ² (01203000)	4,680 / 8.45 6/5/82	50,300 / 17.2 8/19/55 (1931)	
Jacks Brook near Roxbury Falls ² (01203100)	1,030 / 5.93 6/5/82	1,600 / 7.82 9/26/75 (1961)	
Pootatuck River at Sandy Hook ² (01203510)	2,340 / 8.09 6/6/82	2,720 / 8.47 1/25/79 (1966)	
Wood Creek near Bethlehem ² (01203700)	390 / 3.90 6/5/82	600 / 4.61 9/26/75 (1962)	
Pomperaug River at Southbury (01204000)	7,880 / 14.18 6/5/82	29,400 / 21.8 8/19/55 (1932)	
Housatonic River at Stevenson (01205500)	34,000 / 16.57 6/6/82	75,800 / 24.50 10/16/55 (1928)	
West Branch Naugatuck River at Torrington (01205600)	2,220 / 5.51 6/5/82	8,820 / 7.46 9/26/75 (1956)	11,900 / - 8/19/55
East Branch Naugatuck River at Torrington (01205700)	176 / - 6/6/82	1,500 / 4.85 8/5/69 (1956)	6,200 / - 8/19/55
Leadmine Brook near Harwinton ² (01206400)	1,980 / 9.26 6/5/82	2,130 / 9.63 3/21/80 (1959)	
Naugatuck River at Thomaston (01206900)	3,130 / 5.25 6/8/82	5,140 / 6.25 3/31/60 (1959)	53,400 / 27.0 8/19/55
Branch Brook near Thomaston (01208013)	805 / 4.07* 6/8/82	795 / 4.05 9/28/75 (1971)	
Hop Brook near Naugatuck (01208420)	397 / - 6/8/82	905 / 4.71 2/1/82 (1967)	2,650 / - 8/19/55
Naugatuck River at Beacon Falls (01208500)	15,600 / 12.95 6/5/82	26,000 / 14.0 11/-/ 27 (1918)	

STATION	MAXIMUM DISCHARGE (Ft ³ /s) / GAGE HEIGHT (Ft)		
	June 1982	Prior to June 1982	
		Period of Record (earliest record ¹)	Outside Period of Record
Little River at Oxford ² (01208700)	1,350 / 6.47 6/5/82	1,000 / 6.82 1/25/79 (1960)	
<u>PEQUONNOCK RIVER BASIN</u>			
Pequonnock River at Trumbull ² (01208850)	1,850 / 7.64 6/5/82	2,100 / 8.29 4/10/80 (1962)	4,500 / - 10/16/55
<u>ROOSTER RIVER BASIN</u>			
Rooster River at Fairfield (01208873)	2,070 / 11.49 6/5/82	2,170 / 11.65 4/9/80 (1977)	
<u>MILL RIVER BASIN</u>			
Patterson Brook near Easton ² (01208900)	148 / 8.33* 6/5/82	128 / 7.28 4/18/80 (1960)	
Mill River near Fairfield (01208925)	1,710 / 7.00 6/5/82	1,800 / 7.15 4/10/80 (1972)	
<u>SASCO BROOK BASIN</u>			
Sasco Brook near Southport (01208950)	798 / 5.22 6/5/82	1,640 / 7.00 6/19/72 (1964)	
<u>SAUGATUCK RIVER BASIN</u>			
Saugatuck River near Redding (01208990)	825 / 4.45 6/5/82	2,160 / 5.88 3/25/69 (1964)	
<u>NORWALK RIVER BASIN</u>			
Norwalk River at South Wilton (01209700)	1,400 / 4.43 6/5/82	2,890 / 6.27 4/10/80 (1964)	- / 13.5 10/-/55
Betts Pond Brook at Norwalk (01209753)	250 / 3.05* 6/5/82	288 / 2.96 4/10/80 (1980)	
Keelers Brook at Norwalk (01209775)	83 / 2.53 6/5/82	265 / 4.00 4/10/80 (1980)	
<u>RIPPOWAM RIVER BASIN</u>			
Rippowam River near Stamford (01209901)	504 / 4.11 6/6/82	1,890 / 6.56 4/10/80 (1975)	

¹ Refer to sources listed below for details on period of record, including partial records and breaks in records.

² Crest-stage, partial-record stations. Only stations that registered the 1982 peak discharge during the June storm are included.

* Indicates new peak discharge.

Source: Water Resources Data, Connecticut, Water Year 1982, U.S. Geological Survey Water-Data Report CT-82-1; Water Resources Data, Connecticut, Water Year 1981, U.S. Geological Survey Water-Data Report CT-81-1; and L.A. Weiss, USGS, Hartford, Ct.

APPENDIX C

REQUEST FOR MAJOR DISASTER DECLARATION

WILLIAM A. O'NEILL
GOVERNOR



STATE OF CONNECTICUT
EXECUTIVE CHAMBERS
HARTFORD

June 10, 1982

The President
The White House
Washington, D.C. 20500

Mr. President:

Under the provisions of section 301 (b), Public Law 93-288, as implemented by 44 CFR 205.41, I request that you declare a major disaster for the State of Connecticut as a result of a severe storm and flooding which occurred between June 4 and June 7, 1982 in the counties of Fairfield, New Haven, Middlesex, New London, Litchfield, Hartford, Tolland and Windham.

At approximately 8:00 P.M. on June 4, 1982 heavy rains began falling throughout the state and reached record rates of 5.88 inches during the first 24 hours of the storm. Rain continued throughout the day on June 5, 6 and 7 with over 11 inches having fallen in some areas of the state by June 7. There has been no flooding comparable to this in Connecticut since 1955.

The amount and severity of disaster related damages are broken down by type, and preliminary estimates follow:

Private non-agricultural	\$204,691,000
Agricultural	2,500,000
Public (State or Local Government)	<u>69,491,000</u>
Total	276,682,000

As the result of the situation, I directed execution of the state emergency plan on June 5, and declared a statewide emergency on June 6. I have also directed that all appropriate action be taken under state law.

I have determined that this incident is of such severity and magnitude that effective response is beyond the capabilities of the state and affected local governments and that supplementary federal assistance is necessary. Preliminary estimates of the nature and extent of Federal assistance needed under PL-93-288, as amended are tabulated in Enclosures A and B. Estimated requirements for Federal assistance from certain Federal agencies under other statutory authorities are tabulated in Enclosure C.

The following information is furnished on the extent and nature of state resources which have been or will be used to alleviate the conditions of this disaster:

The President
June 10, 1982

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The State Police have closed appropriate roads, assisted in directing evacuations, restricted access to dangerous areas, and are assisting in search and rescue operations.

The National Guard has opened armories for use as shelters, assisted in evacuations, performed sandbagging operations and traffic control, towed stranded vehicles, provided drinking water and enforced curfews.

The Department of Environmental Protection has inspected dams throughout the state, advised on their conditions and assessed damages to these facilities.

The Department of Transportation has inspected state roads and bridges, assessed damages to these facilities and provided advisement on their safety. The Department has also provided thousands of sandbags to local governments and is performing extensive emergency repairs on state roads and bridges throughout the affected areas.

Several other state agencies are performing damage assessments including the Departments of Economic Development, Consumer Protection, Civil Preparedness, Agriculture and Housing. These assessments encompass damage to residential, agricultural and business/industrial property.

The Department of Health Services is publicizing flood-related safety precautions and analyzing water samples.

More information on state resources committed to alleviate this disaster can be found in the attached Supplementary Justification.

I intend to implement the Individual and Family Grant Program as described in the enclosure. I certify that the state is unable to immediately pay its 25 percent share of the cost to implement the program and request that \$250,000 be advanced by the Federal Government. In order to repay this advance, I will request the legislature to appropriate the necessary funds at the beginning of the next regular legislative session. I certify that the advance will be repaid as soon as funds become available; I anticipate that funds will become available by March, 1983.

Pursuant to Federal Emergency Management Agency regulations, I certify that total expenditures and obligations for this major disaster for which no federal reimbursement will be requested are expected to exceed \$17,373,000 in accordance with the table in Enclosure D.

The President
June 10, 1982

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I intend to call a special session of the General Assembly on June 28, 1982 at which time I will recommend legislative authority to pay, through bonding not only the state's 25 percent share of its public loss, but also to reimburse our cities and towns their 25 percent share of losses to publicly owned facilities affected by this disaster.

In addition, I will recommend programs and funding to assist severely affected homeowners and businesses.

I have designated Frank Mancuso as the State Coordinating Officer for this request. He will work with the Federal Emergency Management Agency in damage assessments and may provide further information or justification on my behalf.

Sincerely,


WILLIAM A. O'NEILL
Governor

Enclosures

ESTIMATED REQUIREMENTS FOR
INDIVIDUAL ASSISTANCE
PL 93-288

County	Temp. Hsg.	IFG		DUA		Other
	#	#	\$	#	\$	
New Haven	#173	#200	\$500,000	#150	\$360,000	N/K
Middlesex	# 40	#100	\$250,000	#150	\$360,000	"
New London	# 13	# 50	\$125,000	#150	\$360,000	"
Fairfield	# 7	# 50	\$125,000	#150	\$360,000	"
Hartford	# 2	N/K		N/K	N/K	"
Litchfield	# 0	"		"	"	"
Tolland	# 0	"		"	"	"
Windham	# 1	"		"	"	"
Totals	# 236	# 400	\$1,000,000	#	\$1,440,000	

Temp Hsg = Temporary Housing

IFG = Individual and Family Grant

DUA = Disaster Unemployment Assistance

N/K = Not known

ENCLOSURE A

ESTIMATED REQUIREMENTS FOR PUBLIC ASSISTANCE
PL 93-288
(In Millions)

County Or PNP	Category									Total*
	A	B	C	D	E	F	G	H	I	
New Haven	.5	.61	17.5	N/K	3.2	1.5	N/K	.3	2.5	26.11
Middlesex	.5	.61	20.5	.19	.97	.2	"	.04	.5	23.51
New London	.5	.61	12.5	.8	.38	.52	"	.02	.12	15.45
Fairfield	.5	.61	1.2	N/K	.02	.05	"	.02	.05	2.45
Hartford	N/K	N/K	.6	N/K	.24	.37	"	.01	.4	1.62
Litchfield	"	"	1.1	.5	.01	.03	"	N/K	.01	1.65
Tolland	"	"	1.1	N/K	.03	.01	"	N/K	.2	1.16
Windham	"	"	2.0	.21	.01	N/K	"	.62	N/K	2.84

*Estimates are to reflect total eligible costs before any cost sharing.

PNP = Private, non-profit

N/K = Not known at this time
Not expected to be significant

ENCLOSURE B

ESTIMATED REQUIREMENTS FOR OTHER FEDERAL AGENCY PROGRAMS

COUNTY	SBA HOME LOANS	SBA BUSINESS LOANS	FMHA LOANS	ASCS	SCS	FHMA	DOE SCHOOL GRANTS	COE	OTHER
Middlesex	#10,091 \$9,581,000	#186 @ \$152,000	100	\$500,000	\$250,000	n/k	n/k	n/k	n/k
New Haven	#11,260 \$79,447,000	#377 @ \$152,000	100	\$500,000	\$250,000	n/k	n/k	n/k	n/k
New London	#660 \$4,950,000	#38 @ \$152,000	100	\$500,000	\$250,000	n/k	n/k	n/k	n/k
Fairfield	#1,120 \$6,952,000	#30 @ \$152,000	100	\$500,000	\$250,000	n/k	n/k	n/k	n/k
Hartford	#38 \$341,000	#50 @ \$152,000	100	n/k	n/k	n/k	n/k	n/k	n/k
Tolland	n/k	#7 @ \$152,000	50	n/k	n/k	n/k	n/k	n/k	n/k
Windham	#1 \$22,000	#5 @ \$152,000	50	n/k	n/k	n/k	n/k	n/k	n/k
Litchfield	n/k	#30 @ \$152,000	25	n/k	n/k	n/k	n/k	n/k	n/k
TOTALS	#14,179 \$101,293,500	#700 \$107,000,000	625	\$2,000,000	\$1,000,000	n/k	n/k	n/k	n/k

ENCLOSURE C

n/k = not known at this time

GOVERNOR'S CERTIFICATION

I certify that for this current disaster, State and local government expenditures and obligations will constitute a reasonable amount of the funds of such State and local governments for alleviating the damage, loss, hardship or suffering resulting from such disaster. As stated in my basic letter, and based on information available at this time, tabulation of these estimated total expenditures and obligations, for which no Federal reimbursement will be requested, follows:

Category of Assistance	State	Amount	Local
Individual Assistance:			
Housing	\$	\$	
Individual & Family Grants		250,000	
Mass Care			
Other (specify)			
Total		250,000	
Public Assistance:			
Category A - Debris Clearance		250,000	250,000
Category B - Protective Measures		212,750	400,000
Category C - Road Systems		3,250,000	10,875,000
Category D - Water Control Facilities		475,000	0
Category E - Public Buildings and Related Equipment		199,250	1,065,250
Category F - Public Utilities		0	601,500
Category G - Facilities Under Construction		0	0
Category H - Private, Nonprofit Facilities		0	0
Category I - Other (not in above categories)		400,000	506,750
Total		4,787,000	13,698,500
Other: NATIONAL GUARD		90,000	
Total			
Grand Total		5,127,000	13,698,500

SUPPLEMENTARY JUSTIFICATION STATE DAMAGE ASSESSMENT

I. Background

The communities affected by this disaster are economically diverse in terms of unemployment rates and median household income levels. Several of the affected communities have unemployment rates in excess of the national average including Naugatuck (10.4%), Seymour (10.2%), Ansonia (10.8%), Bridgeport (10.8%) and Bozrah (10.7%). Other affected communities have high unemployment rates, though not in excess of the national average, including Derby (8.4%), West Haven (8.0%), Norwich (8.0%), Wallingford (9.0%) and Oxford (9.0%).*

Agricultural interests in Connecticut have already suffered setbacks this year including a blizzard in April and three weeks of dry weather which has delayed germination of corn seed. The recent flooding will undoubtedly prove a severe blow to this group.

Previous experience in Connecticut has shown that anything other than routine flooding tends to affect numbers of residences and businesses without flood insurance. According to state insurance officials, this will hold true for the current disaster and will result in a large uninsured loss margin for both of these groups.

II. Impacts

A. Effects On People

At this time there are ten confirmed flood related deaths and a number of flood related injuries. Flood waters have forced the evacuation of approximately 1,300 residents causing the opening of shelters in 21 communities. As of June 8, shelters were open in 2 communities providing care for 27 evacuees.

Present assessments indicate that 37 homes have been destroyed, that 1,538 have sustained significant damage and that perhaps 15,574 have been affected. It is likely additional homes have been destroyed or damaged but not discovered by damage assessors because of washed out roads and bridges which have made some areas inaccessible. It is anticipated there will be a need for temporary housing assistance primarily in Middlesex and New Haven counties as well as unemployment assistance for those whose places of employment have been damaged or destroyed.

There has been widespread disruption of public and private utility services and this continues to be a problem in several affected areas.

*Based on April 1982 unemployment figures.

B. Significant Effects on State and Local Governments

State and local governments face severe financial hardships because of the many road and bridge washouts which have occurred. There has also been serious damage to state parks and some municipal buildings. An estimated 70 stretches of state highway have been destroyed as have some 13 state bridges. Rail service along the entire shoreline was knocked out by a catenary tower failure and 12 major washouts.

Approximately four sewage treatment plants are in need of extensive repair. An additional 14 plants were damaged less severely. Approximately 25 town bridges have been destroyed or damaged.

Two communities have reported loss of vital records due to flooding of municipal buildings.

High water, exposure of sewer pipes, power outages, contaminated wells, isolation of some areas, road/bridge washouts, disruption of water supplies are responsible for continuing and significant public health and safety problems. This is particularly true in the communities of Essex, Hamden, East Lyme, Deep River, Cheshire and Chester. The State Department of Environmental Protection has warned against swimming and other recreational uses of rivers due to sewage which has been washed into them.

The extreme property loss in Essex will undoubtedly have a long-range adverse effect on that community's tax base.

C. Significant Effects on Agriculture

It is estimated that millions of dollars worth of damage has been done to crops in Connecticut as a result of the flooding. Crops affected include tobacco, corn, cabbage, tomatoes, broccoli, brussels sprouts and beans. Harvesting of hay has been delayed, serious soil erosion has occurred, and supplies of fertilizers and pesticides have been destroyed. It is also believed that the rains and flooding have resulted in crucial nitrogen loss from the soil. Many full and part-time farm workers will be denied employment opportunity.

Agricultural damage appears to be most severe in Hartford, New Haven and Middlesex counties.

D. Significant Effects On Businesses

There has been extensive damage to businesses as a result of the weekend flooding. Our estimates indicate that over 600 business establishments suffered substantial damage to building structures, machinery and inventories, as well as experiencing unreported and continuing business interruption losses. Financial assistance for business recovery could require in excess of \$100 million. It is expected that over 1,000 people will be without jobs for an extended period of time. As of this morning, 293 unemployment claims had been filed with the Connecticut Department of Labor. At this time, major business losses appear to be centered in the Essex, Milford, New Haven areas and the City of Waterbury. The State Department of Economic Development will continue to assess business losses and needs.

The \$1.8 billion Connecticut tourism industry will be impacted by required closings of state facilities and inaccessibility to private and public facilities due to road related problems. Known damage to tourism facilities has been accounted for in the total business sector report.

III. State and Local Response

A. State

The following state agencies have responded to this emergency with the equipment and personnel listed below:

State Police: Personnel

All "normal" patrol territories were staffed with State Police personnel. This amounted to 75 patrols X 3 shifts or 225 patrolmen. An additional 2,192 overtime hours were also spent above these normal patrols.

These above figures do not include the regular and overtime hours spent by Resident State Troopers in the affected localities.

State Police: Equipment

Beyond personnel resources, the following material was committed to the flooding, traffic control and evacuation activities:

1. The State Police established two (2) Command Posts (Essex and Westbrook) to coordinate police operations. Additionally, they helped staff the Office of Civil Preparedness Main Command Center at the State Armory, Hartford.

2. State Police radio and teleprocessing services were used to coordinate operations and exchange information.

3. From the Emergency Services Unit:

- a. 16' boat
- b. 19' boat
- c. 4-wheel drive Broncos
- d. emergency lighting equipment

Department of Transportation (DOT): Personnel

The State Department of Transportation estimates that 1,500 employees were used between the period of June 5 to June 8, 1982.

Department of Transportation: Equipment

To assist the above DOT personnel, some 600 state trucks and 100 payloaders and other heavy equipment were used.

In addition to state owned resources, some \$40,000 worth of rental equipment, materials and services were used in highway and bridge work. Emergency contracts were awarded to remove failed bridges from the streams.

In the area of public transportation, 28 charter buses were used as a substitute to washed out rail service.

State Office of Policy & Management (OPM): Personnel

The Intergovernmental Relations Division of OPM committed the fifteen (15) staff members for a total of 120 man-hours toward the emergency.

State Office of Policy & Management (OPM): Equipment

Fourteen (14) state vehicles are being used by the above personnel in this emergency service.

State Department of Environmental Protection (DEP): Personnel

DEP has estimated that 108 people have worked on regular and overtime in this emergency.

DEP: Equipment

In addition to personnel, DEP has committed 62 passenger vehicles, 4 bucket loaders, 12 boats and 1 dump truck.

State Health Department: Personnel

The Health Department assigned 24 people to this emergency situation between June 5th and June 8th. These personnel included staff from the Disease Prevention, Hospital Medical Care and Office of Emergency Medical Services.

Health Department: Equipment

To assist the above personnel, the Health Department assigned 10 motor vehicles and one set of special radio equipment.

State Housing Department: Personnel

The State Housing Department estimates that 35 of its staff worked on this flooding emergency from June 5th to June 8th, 1982.

Housing Department: Equipment

It is estimated that 15 state vehicles assigned to this department are being used in this emergency.

State Department of Consumer Protection: Personnel

This state agency is responsible for inspecting and securing various food establishments and pharmacies that may have been damaged or otherwise affected by this emergency.

The Food Inspection Unit assigned 17 personnel to make inspections of food establishments in the period between June 5th and June 8th, 1982.

Consumer Protection: Equipment

Some 15 state vehicles are being used by both the drug and food enforcement units.

Department of Administrative Services
Bureau of Public Works: Personnel

The Bureau of Public Works has assigned 30 staff personnel to inspect damage to state owned buildings throughout the state.

Bureau of Public Works: Equipment

At least 3 state vehicles were used during the height of the storm for building inspection.

One new sump pump was purchased and one sump pump was rented.

Economic Development: Personnel

Fourteen (14) economic development specialists and 4 administrative staff have been assigned to assist both small and large businesses throughout the affected area.

Economic Development: Equipment

Sixteen (16) state vehicles are assigned to the above staff.

National Guard: Personnel

Two hundred fifty-four (254) National Guardsmen were activated to assist state and local governments during the emergency.

National Guard: Equipment

At least 3 helicopters and 11 water trucks were used during the emergency.

State personnel and equipment from all of the above agencies continue to be used in response to this emergency.

Some state monies may be available for use in this emergency from the Governor's Contingency Fund and the Emergency Repair Fund for Roads and Bridges (13a175J).

B. Local Response

It is estimated that 6,707 local employees and 1,122 pieces of local equipment were committed to this emergency.

APPENDIX D

FINANCIAL ASSISTANCE TO TOWNS AND STATE AGENCIES BY FEMA AND OPM

FEMA Town Applicants

DEC 31 1981

Agency	Amount Requested	Approved by State	Approved by FEMA	State Paid	Advanced by FEMA	Total Paid	Date Paid	Remainder FEMA
	\$	\$	\$	\$	\$	\$		\$
Ansonia	110,926	109,581	109,581	27,395	61,639	89,034	091382	20,547
Ansonia (Sup.#1)	46,119	45,405	45,405	11,351	25,540	36,891	041883	8,514
Beacon Falls	24,817	24,817	24,817	6,204	18,613	24,817	090982	0
Bethany	33,636	33,636	33,636	8,409	18,920	27,329	090182	6,307
Bethany (Sup.#1)	4,085	4,085	4,085	1,021	2,298	3,319	021583	766
Bozrah	15,250	15,250	14,756	3,689	11,067	14,756	110482	0
Branford	109,339	88,237	88,159	22,040	49,589	71,629	090182	16,530
Branford (Sup.#1)	5,511	5,511	5,511	1,378	3,100	4,478	051283	1,033
Bridgeport	101,405	101,405	101,405	25,351	57,041	82,392	101482	19,013
Cheshire	310,071	100,904	100,904	25,226	56,759	81,985	101482	18,919
Cheshire (Sup.#1)	222,314	222,314	222,314	55,579	125,052	180,631	120882	41,683
Chester	285,157	285,157	274,741	68,685	154,542	223,227	101482	51,514
Chester (Sup.#1)	28,691	28,691	28,691	7,173	16,139	23,312	040783	5,379
Chester (Sup.#2)	15,427	15,427	15,427	3,857	8,678	12,535	082283	2,892
Clinton	60,598	60,598	60,597	15,149	34,086	49,235	101482	11,362
Clinton (Sup.#1)	70,198	70,198	70,198	17,549	39,486	57,035	081583	13,163
Colchester-Town	117,327	88,621	88,621	22,155	49,849	72,004	091382	16,617
Colchester-T (Sup.#1)	26,304	26,304	26,304	6,576	14,796	21,372	041573	4,932
Colchester-T (Sup.#2)	15,164	15,164	15,164	3,791	8,530	12,321	041583	2,843
Colchester-Borough	13,323	4,771	4,771	1,193	3,578	4,771	100482	0
Colchester-B (Sup.#1)	7,228	7,228	7,228	1,807	5,421	7,228	040783	0
Danbury	20,820	20,820	20,820	5,205	15,615	20,820	101482	0
Deep River	213,096	213,096	219,231	54,808	106,027	160,835	091382	58,396
Deep River (Sup.#1)	3,670	3,670	3,670	917	2,064	2,981	082283	689
Derby	84,743	84,743	89,906	22,477	50,572	73,049	102282	16,857
Derby (Sup.#1)	1,344	1,344						
Durham	23,321	21,667	22,995	5,749	17,246	22,995	121082	0
East Haddam	413,815	413,815	413,815	103,454	232,771	336,225	100482	77,590
East Haddam (Sup.#1)	21,946	21,946	21,946	5,486	12,352	17,838	082283	4,108
East Hampton	182,663	182,663	182,663	45,666	102,748	148,414	100482	34,249
East Hampton (Sup.#1)	16,384	16,384	16,384	4,096	9,216	13,312	041583	3,072
East Hampton (Sup.#2)	40,034	40,034	40,034	10,008	22,519	32,527	082283	7,507
East Haven	88,726	86,329	86,329	21,582	48,560	70,142	091382	16,187
East Haven (Sup.#1)	38,008	38,008	38,008	9,502	21,380	30,882	121782	7,126
East Haven (Sup.#2)	97,032	97,032	97,032	24,258	54,580	78,838	051283	18,194
East Lyme	155,632	146,751	146,751	36,688	82,547	119,235	113082	27,516
East Lyme (Sup.#1)	26,069	26,069	26,069	6,517	14,664	21,181	081283	4,888
East Lyme (Sup.#2)	27,126	27,126						
Easton	10,108	10,108	10,108	2,527	7,581	10,108	100482	0
Essex	391,140	391,140	391,140	97,785	220,016	317,801	100482	73,339
Essex (Sup.#1)	5,490	5,490	5,490	1,372	3,088	4,460	082283	1,030
Franklin	8,468	8,468	8,468	2,117	6,351	8,468	090182	0
Franklin (Sup.#1)	2,800	2,800	2,800	700	2,100	2,800	092383	0
Croton - City of	130,709	79,051	79,051	19,763	44,466	64,229	102282	14,822
Croton - Town	45,522	35,932	35,932	8,983	20,212	29,195	090982	6,737
Croton - Town(Sup.#1)	5,222	5,222	5,222	1,306	2,937	4,243	051283	979
Guilford	150,484	144,135	144,135	36,034	81,076	117,110	100482	27,025
Guilford (Sup.#1)	3,173	3,173	3,173	793	1,785	2,578	042883	595
Haddam	699,026	495,331	430,343	107,586	242,068	349,654	113082	80,689
Haddam (Sup.#1)	23,909	23,909	23,909	5,977	13,449	19,426	040783	4,483
Haddam (Sup.#2)	136,073	136,073	136,073	**34,081	76,541	110,622	092283	25,451
Haddam (Sup.#3)	9,408	9,408						
Hamden	845,369	427,327	427,327	106,832	240,371	347,203	102282	80,124
Hamden (Sup.#1)	41,430	41,087	41,087	10,272	23,111	33,383	030183	7,704
Hamden (Sup.#2)	93,884	20,245	20,245	5,061	11,388	16,449	081183	3,796
Hamden (Sup.#3)	153,780	153,780						
Killingworth	198,407	198,407	198,407	49,602	111,604	161,206	092482	37,201
Lebanon	20,911	20,911	20,911	5,228	15,683	20,911	113082	0

Agency	Amount Requested	Approved by State	Approved by FEMA	State Paid	Advanced by FEMA	Total Paid	Date Paid	Remainder FEMA
	\$	\$	\$	\$	\$	\$		\$
Ledyard	59,944	56,744	55,844	13,961	31,412	45,373	120982	10,471
Lisbon	3,091	3,091	3,091	773	2,318	3,091	120282	0
Lyne	174,593	174,593	171,100	42,775	96,244	139,019	101482	32,081
Lyne (Sup.#1)	10,893	10,893	10,893	2,723	6,127	8,850	041583	2,043
Madison	36,672	26,589	1,111	278	833	1,111	120982	0
Madison (Sup.#1 Flex)	30,281	30,281	27,252	6,813	15,330	22,143	030283	5,109
Mattabassett District	11,262	11,085	11,085	2,771	8,314	11,085	100782	0
Meriden	29,149	29,149	29,149	7,287	16,397	23,684	102282	5,465
Meriden (Sup.#1)	6,143	6,143	6,143	1,536	3,455	4,991	031583	1,152
Middlebury	42,164	41,658	41,658	10,415	23,433	33,848	102282	7,810
Middlebury (Sup.#1)	49,067	49,067	49,067	12,267	27,600	39,867	041583	9,200
Middlefield	18,593	18,593	18,593	4,648	13,945	18,593	090982	0
Middletown	125,578	121,854	121,854	30,463	68,543	99,006	113082	22,848
Middletown (Sup.#1)	17,753	17,753	17,753	4,438	9,986	14,424	041583	3,329
Milford	488,865	338,114	338,114	84,529	190,189	274,718	100482	63,396
Milford (Sup.#1)	58,765	58,765	58,765	14,691	33,055	47,746	030183	11,019
Milford (Sup.#2)	9,439	9,439						
Monroe	46,014	46,014	46,014	11,504	25,833	37,337	100782	8,677
Montville	56,170	54,770	54,770	13,693	30,808	44,501	091382	10,269
Naugatuck	234,824	130,300	130,300	32,575	73,294	105,869	113082	24,431
Naugatuck (Sup.#1)	87,779	87,779	87,779	21,945	49,376	71,321	041883	16,458
Naugatuck-Hous. Auth.	8,271	8,271	4,570	1,142	3,428	4,570	113082	0
New Haven	1,008,955	709,241	709,241	177,310	398,948	576,258	121782	132,983
New Haven (Sup.#1)	84,717	84,717	84,717	21,179	47,653	68,832	042883	15,885
New London	44,701	33,900	34,511	8,628	19,413	28,041	100482	6,470
Newtown	45,978	45,978	45,978	11,495	25,863	37,358	101482	8,620
North Branford	25,083	23,086	24,892	6,223	18,669	24,892	100482	0
North Haven	65,895	61,287	61,287	15,322	34,474	49,796	102282	11,491
North Haven (Sup.#1)	1,015	1,015						
North Stonington	66,504	20,774	20,774	5,186	11,686	16,872	120282	3,902
North StoningtonS.#1	46,950	46,950						
Norwich	95,869	91,680	91,680	22,920	51,570	74,490	100482	17,190
Norwich (Sup.#1)	8,523	8,523						
NE Acad Jewish Study	169,535	169,535	169,535	42,384	95,363	137,747	092482	31,788
Old Lyne	1,110,269	203,317	203,317	50,829	114,366	165,195	113082	38,122
Old Lyne (Sup.#1)	92,026	91,850	91,850	22,962	51,666	74,628	082283	17,222
Old Lyne (Sup.#2)	913,913	913,913	835,184	208,796	578,554	787,350	122383	47,834
Old Saybrook	27,032	27,032	27,032	6,758	15,206	21,964	091382	5,068
Old Saybrook (Sup.#1)	46,961	46,961	46,961	11,740	26,416	38,156	122082	8,805
Old Saybrook (Sup.#2)	7,502	7,502	7,502	1,876	4,220	6,096	040783	1,406
Orange	26,391	25,512	25,512	6,378	14,351	20,729	092482	4,783
Orange (Sup.#1)	6,944	6,944	6,944	1,736	3,906	5,642	111082	1,302
Oxford	76,905	76,905	76,905	19,226	43,259	62,485	091382	14,420
Oxford (Sup.#1)	5,965	5,965	5,966	1,492	3,356	4,848	113082	1,118
Oxford (Sup.#2)	18,640	18,640	18,640	4,660	10,485	15,145	041883	3,495
Portland	32,058	32,058	32,058	8,015	18,033	26,048	113082	6,010
Preston	2,194	2,194	2,195	549	1,646	2,195	090982	0
Prospect	80,436	80,436	79,806	19,952	44,891	64,843	092482	14,963
Prospect (Sup.#1)	18,167	18,167	18,167	4,542	10,219	14,761	081183	3,406
Prospect (Sup.#2)	5,742	5,742	5,742	1,436	32,30	4,666	092183	1,076
Salen	15,032	15,032	15,033	3,758	11,275	15,033	090182	0
Seymour	159,702	150,798	150,798	37,700	84,824	122,524	102282	28,274
Seymour (Sup.#1)	1,993	1,993	1,993	498	1,121	1,619	051183	374
Seymour-Hous. Auth.	74,115	74,115	74,115	18,529	41,690	60,219	031183	13,896
Shelton	163,723	163,723	163,723	40,931	87,069	128,000	100782	35,723
Shelton (Sup.#1)	122,603	122,603	122,603	30,651	68,964	99,615	081183	22,988
Southbury	66,185	66,186	66,186	16,547	37,320	53,867	090182	12,319
Sprague	7,239	7,239	7,239	1,810	5,429	7,239	090982	0
Stonington	120,631	120,631	120,631	30,158	67,855	98,013	091382	22,618
Stratford	12,295	12,087	14,002	3,500	10,502	14,002	113082	0
SC Ct Reg Water Auth	282,784	278,627	278,627	69,657	156,728	226,385	091382	52,242
SC Ct Reg Water Auth	4,158	4,158	4,158	1,040	2,339	3,379	051283	779

Agency	Amount Requested	Approved by State	Approved by FEMA	State Paid	Advanced by FEMA	Total Paid	Date Paid	Remainder FEMA
SC Ct Reg Water Auth	\$ 21,995	\$ 19,564	\$ 19,564	\$ 4,891	\$ 11,005	\$ 15,896	082383	\$ 3,668
Sturtevant	30,121	30,121	30,121	7,530	16,943	24,473	101482	5,648
Voluntown	2,392	2,392	2,392	598	1,794	2,392	090982	0
Wallingford	55,002	55,002	55,002	13,751	30,939	44,690	090182	10,312
Wallingford (Sup.#1)	2,500	2,500	2,500	625	1,406	2,031	082283	469
Waterbury	83,385	70,277	70,277	17,569	39,531	57,100	100482	13,177
Waterford	102,528	95,163	95,163	23,791	53,529	77,320	100482	17,843
Waterford (Sup.#1)	18,956	18,956	18,956	4,739	10,663	15,402	040783	3,554
Waterford Cntry. Sch.	23,767	23,767	23,767	5,942	13,369	19,311	111082	4,456
West Haven	31,064	31,064	26,468	6,617	14,888	21,505	092482	4,963
West Haven (Sup.#1)	4,596	4,596	4,596	1,149	2,585	3,734	041583	862
West Shore Fire Dist.	2,374	2,374	2,374	593	1,781	2,374	121782	0
Westbrook	96,743	96,743	96,743	24,186	54,418	78,604	010383	18,139
Westbrook (Sup.#1)	86,619	86,619	86,619	21,655	48,723	70,378	040783	16,241
Westport	1,271	1,271	1,271	318	953	1,271	100482	0
Wolcott	71,201	65,087	65,087	16,272	36,311	52,583	091382	12,504
Wolcott (Sup.#1)*	55,879	55,879	55,879	13,064	31,432	44,495	041583	10,477*
Woodbridge	33,587	32,427	32,427	8,107	18,240	26,347	092482	6,080
TOTAL	\$ 13,547,253	\$ 10,908,561	\$ 10,471,404	\$ 2,617,007	\$ 6,022,400	\$ 8,639,407		\$ 1,831,091
TOTAL TOWNS&STATE AGENCIES	\$ 16,529,515	\$ 13,845,972	\$ 12,913,873	\$ 2,836,868	\$ 6,976,888	\$ 9,813,756		\$ 2,141,987
TOTAL ALL TOWNS AND STATE AGENCIES			\$ 14,910,631	\$ 3,336,061		\$ 10,312,949		

*Adjustment not yet recognized by FEMA.
State reimbursed unallowed portion.
FEMA will adjust at final audit. +906=11,383
*should be \$34,018

DEC 31

FEMA State Agencies

Agency	Amount Requested	Approved by State	Approved by FEMA	State Paid	Advanced by FEMA	Total Paid	Date Paid	Remainder FEMA
Dept. Child.&Youth Sv	11,505	11,505	11,505		8,629	8,629	112482	0
Dept. Consumer Prot.	7,260	7,260	7,260		5,445	5,445	112482	0
Dep Environment. Prot	393,325	393,325	179,941	39,456	101,217	140,673	102182	33,739
DEP (Sup.#1)	204,063	204,063	196,717	49,179	110,653	159,832	022483	36,885
DEP (Sup.#2)	106,517	106,517	106,517	26,629	59,916	86,545	081283	19,972
Dept Mental Health	5,771	5,771	5,771		4,328	4,328	110582	0
Dept MR & Corrections	5,302	5,302	2,802		2,102	2,102	070683	0
Dept. Public Safety	100,695	59,444	59,444		33,437	33,437	101382	11,146
Dept.Pub.Saf.(Sup.#1)	29,059	29,059	29,059		16,346	16,346	041183	5,448
Dept Transportation	692,097	688,497	*443,704	104,597.	249,584	354,181	101382	83,194
U-Conn	1,727	1,727	1,727		1,295	1,295	110882	0
DOT (Supp #1)	642,731	642,731	642,731		361,536	361,536	091483	120,512
DOT (Supp #2)	782,210	782,210	755,291					
TOTAL	2,982,262	2,937,411	2,442,469	219,861	954,488	1,174,349		310,896

*This number to be reduced by 25,300 to 418,404 which represents the true claimable costs.
FEMA's share will be adjusted with the last payment.

Flood Disaster Relief
Northern Counties

Town	Total Amount Approved by OPM	Requested by Applicant 25%	Approved by State 25%	Date Paid
Andover	15,037	3,759	3,759	11/05/82
Andover (Sup.#1)	1,556	389	389	1/06/83
Asford	766	192	192	10/01/82
Barkhamsted	9,820	2,455	2,455	10/07/82
Berlin	20,395	5,099	5,099	10/20/82
Bristol	137,378	34,344	34,344	10/20/82
Bristol (Sup.#1)	116,149	29,037	29,037	11/19/82
Bristol (Sup.#2)	21,948	5,487	5,487	12/27/82
Canterbury	22,754	5,689	5,689	11/05/82
Chaplin	12,850	3,213	3,213	11/05/82
Coventry	44,537	11,134	11,134	02/17/83
Coventry Lake V.T.A.	1,300	325	325	11/22/82
East Granby	7,997	1,999	1,999	10/02/82
Eastford	780	195	195	10/22/82
Envir. Prot.	23,680	6,125	5,920	11/23/83
Farmington	12,911	3,228	3,228	10/20/82
Farmington (Sup.#1)	7,642	1,911	1,911	02/01/83
Farmington (Sup.#2)	261,234	65,309	65,309	11/02/83
Glastonbury	2,518	629	629	10/22/82
Glastonbury (Sup.#1)	28,725	7,181	7,181	11/30/82
Hampton	9,406	2,351	2,351	10/01/82
Hartford	27,462	6,866	6,866	11/05/82
Hartford Hous. Auth.	5,274	1,319	1,319	11/17/82
Harwinton	23,543	5,886	5,886	11/19/82
Harwinton (Sup.#1)	2,384	596	596	11/04/83
Hebron	114,071	28,517	28,517	10/12/82
Hebron (Sup.#1)	5,942	1,486	1,486	10/20/82
Litchfield	20,672	5,168	5,168	10/20/82
Mansfield	53,607	13,402	13,402	11/18/82
Marlborough	43,617	10,904	10,904	10/12/82
Marlborough9sup.#1)	724	181	181	10/22/82
New Britain	20,239	5,060	5,060	12/17/82
Plymouth	29,755	7,439	7,439	11/01/82
Plymouth (Sup.#1)	3,543	886	886	11/21/82
Ponfret	27,752	6,938	6,938	11/05/82
Rocky Hill	17,070	4,267	4,267	10/14/82
Rocky Hill (Sup.#1)	4,700	1,176	1,176	1/24/83
Scotland	57,769	14,442	14,442	10/01/82
Simsbury	20,535	5,134	5,134	11/30/82
Simsbury (Sup.#1)	20,369	5,092	5,092	02/01/83
South Windsor	10,585	2,646	2,646	10/01/82
Stafford	27,140	6,785	6,785	10/22/82
Transportation	329,420	82,355	82,355	06/16/83
U-ConnW.Hartford	6,906	1,727	1,727	11/18/82
Tolland	18,425	4,606	4,606	09/21/83
Waterfront Manor A.	326	82	82	12/19/82
Watertown	24,288	6,072	6,072	11/02/82
Watertown (Sup.#1)	27,490	6,873	6,873	11/19/82
West Hartford	99,391	24,848	24,848	10/01/82
West Hartford(Sup.#1)	48,114	12,028	12,028	11/01/82
Winchester	31,978	7,995	7,995	10/14/82
Woodbury	102,081	25,520	25,520	11/19/82
Woodstock	12,203	3,051	3,051	3/15/83
TOTAL	1,996,758	499,398	499,193	

APPENDIX E

FEDERAL/STATE AGREEMENT FOR DISASTER ASSISTANCE



Federal Emergency Management Agency

Region I J.W. McCormack Post Office and Court House
Boston, Massachusetts 02109

Honorable William O'Neill
Governor of Connecticut
State Capitol
Hartford, CT 06115

June 15, 1982

Dear Governor O'Neill:

1. This letter is the Federal-State Disaster Assistance Agreement for a Major Disaster, No. FEMA-661-DR, under the Disaster Relief Act of 1974, as amended, 42 USC 5121 et seq: Public Law 93-288, hereinafter referred to as the Act), in accordance with 44 CFR 205.44 (Please note that these Regulations were formerly designated 24 CFR, Part 2205). Exhibit A, Federal Financial Assistance and Exhibit B, State Certification Officers are attached hereto and made a part hereof.
2. On June 14, 1982, the President determined that damages resulting from severe storms and flooding have caused a Major Disaster in your State, and you hereby acknowledge receipt of notice of this declaration. You have certified in your request a commitment of \$5,127,000 on the part of the State and \$13,698,500 on the part of the local government. A copy of your request and supplement of June 10, 1982, are attached as Exhibit C and made a part hereof. You have further indicated your intention to request from the State legislature full reimbursement for local government for Public Assistance expenditures. You have also indicated your intent to implement the Individual and Family Grant Program, and this expression of intent represents your agreement to comply with 44 CFR 205.44(f).
3. Federal assistance will be made available in accordance with the Act, Executive Order 12148, and the implementing Regulations found in Title 44 Code of Federal Regulations as amended and currently applicable handbooks. Reimbursement to the State for eligible disaster costs will be based on the submission and FEMA approval of project applications and vouchers supported by detailed breakdown of eligible costs.
4. No project applications will be approved for assistance unless the damage or hardship to be alleviated resulted from the major disaster which took place on June 4 through June 7, 1982.
5. In the event that funds are to be transferred to the State of Connecticut for disaster relief purposes, the State and its political subdivisions agree to the following: In the event that the State of Connecticut or its political subdivisions violates any of the conditions imposed upon disaster relief assistance under Public Law 93-288, this Agreement or

- applicable Federal Regulations, the Director of FEMA, or his delegate, will notify the State that additional financial assistance for the purpose of the project in connection with which the violation occurred will be withheld until such violation has been corrected. Provided, however, that the Director of FEMA, or his delegate will notify the State that further financial assistance will be withheld for the project for which it has been determined that a violation exists, or for all or any portion of financial assistance which has or is to be made available to the State or local governments for the purpose of disaster relief assistance under the provisions of the Act, this Agreement, or applicable Federal Regulations or handbooks. The State further agrees that FEMA or State auditors, the Governor's Authorized Representative, the Regional Director, the Associate Director, and the Comptroller General of the United States or their duly authorized representatives shall for the purpose of audit and examination have access to any books, documents, papers, and records of any recipients of Federal disaster assistance and of any persons or entities which perform any activity which is reimbursed to any extent with Federal disaster assistance funds dispersed under the authority of the Act.
6. No Member or Delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this Agreement, or to any benefit to arise thereupon: Provided, however, that this provision shall not be construed to extend to any contract made with a corporation for its general benefit.
 7. The State Officers authorized to execute certification and otherwise to act on behalf of the State are listed in Exhibit B which is attached hereto and made a part hereof.
 8. The State agrees that, as a condition for any Federal loan or grant, the State or the applicant shall evaluate the natural hazards in the areas in which the proceeds of the grants or loans are to be used and shall make appropriate recommendations to mitigate such hazards for Federally assisted projects. The State further agrees:
 - (1) to follow up with applicants, within State capabilities, to assure that, as a condition for any grant or loan under the Act, appropriate hazard mitigation actions are taken; (2) to prepare and submit not later than 180 days after the declaration to the Regional Director for concurrence, hazard mitigation plan or plans for the designated areas, and (3) to review and update as necessary disaster mitigation portions of the emergency plans. The Regional Director agrees to make Federal technical advice and assistance available to support the planning efforts and actions.

9. Federal assistance extended under the Act and this Agreement shall be limited to the following area of the State of Connecticut and such additional areas as may be subsequently designated by the Associate Director for State and Local Programs and Support of the Federal Emergency Agency:

For Individual Assistance and Public Assistance: Fairfield, New Haven, New London, and Middlesex Counties.

For Individual Assistance only: Hartford, Litchfield, Tolland and Windham Counties.
10. The State agrees to assume responsibility for the administration and operation of the disaster Temporary Housing Program in accordance with Exhibit D, Administration of the Temporary Housing Program, which is attached hereto and made a part hereof. The State further agrees to assume all financial responsibility for the disaster Temporary Housing Program beginning no later than eighteen months from the disaster declaration date, unless that date is extended by the Associate Director for State and Local Programs and Support.
11. The Governor shall establish through the State agency responsible for regulations of the insurance industry, adequate measures to ensure that insurance companies make full payment of insurance benefits to disaster victims. The State also shall take all responsible steps to ensure that disaster victims are aware of procedures for filing insurance claims, are informed of any State procedures instituted for assisting insured disaster victims, and are aware of their responsibility to repay government assistance which is duplicated by insurance proceeds.
12. The State will establish and maintain an active State program under this Agreement of nondiscrimination in disaster assistance outlined in 44 CFR 205.16. This program will encompass all State and local actions to this Agreement.
13. The State will establish and maintain a program under this Agreement to assure that recipients of FEMA disaster assistance comply with the HUD Consolidated List of Debarred, Suspended, and Ineligible Contractors. This program will encompass all State and local contracts pursuant to this Agreement.

14. The State will notify all States and local agencies and local governments within the areas defined by this Agreement of the time limitations agreed to herein and the terms and conditions of eligibility for Federal assistance.
15. The State of Connecticut understands that it is the intent of the Federal Government to take whatever action is necessary to charge for, or otherwise recover the Federal Government's expenditures in providing assistance to alleviate the hardship, suffering or damages resulting from severe storms and flooding which began on or about June 4, 1982, if any party is liable for causing or contributing to the effects of the disaster. Such actions may include a request to the Department of Justice to institute legal action against any potentially liable party.
16. The State of Connecticut agrees, on behalf of itself, its agencies and employees, on behalf of its political subdivisions, including any municipal corporation, local government, district or board, and on behalf of any other recipients of Federal disaster assistance, as a condition of receiving Federal disaster assistance benefiting the State, a political subdivision or its citizens:
 - a. That the State and its political subdivisions shall pursue vigorously and expeditiously, for the purpose of recovering Federal expenditures in providing disaster assistance following the severe storms and flooding which began on or about June 4, 1982, all available remedies and rights of recovery against any party or parties which might be liable, and further, that the State and its political subdivisions shall cooperate, in a reasonable manner, with the United States in the latter's efforts to ensure compliance with the provisions of this paragraph;
 - b. That, in the event that the State or a political subdivision obtains a recovery from responsible party, the United States shall be reimbursed its expenditures in providing disaster assistance following the severe storms and flooding in Connecticut in accordance with the following:
 1. The recovering party, as well as the United States, first shall be reimbursed their reasonable costs of litigation from such recovered funds; for the purpose of this paragraph, costs of litigation shall include reasonable attorneys' fees incurred, reasonable experts' fees, court costs and all other reasonable additional costs related to the preparation and prosecution of legal action for recovery;
 2. Funds recovered in excess of the costs of litigation shall be paid, on a priority basis, to the United States as reimbursement for Federal expenditures resulting from the declaration of major disaster for severe storms and flooding in Connecticut, until all such expenditures have been reimbursed; for the purpose of this paragraph,

the Federal expenditures shall include the amount of assistance plus the additional costs attributable solely to the disaster declaration;

- c. That FEMA General Counsel shall have the opportunity to review any proposed settlement between the State or a political subdivision and a responsible party, and no settlement shall be made if the FEMA General Counsel objects within thirty (30) days after receiving notice of any proposed settlement;
 - d. That neither the State nor a political subdivision shall oppose intervention by the United States in any legal action instituted in accordance with this paragraph;
 - e. Upon request, to assign to the United States any remedies or rights of recovery it has, or its political subdivisions have, against any party or parties, to the extent of Federal expenditures resulting from severe storms and flooding in Connecticut;
 - f. That United States may enforce any of the provisions of this paragraph by appropriate judicial actions, by withholding Federal funding or by offsetting against current or future disaster assistance payments.
17. This Agreement may be amended at any time with written approval of both parties.

Sincerely,

David M. Sparks
David M. Sparks
Regional Director

Agreed:

William C. O'Hara
Governor, State of Connecticut

June 18, 1982
Date

Attachments

APPENDIX F

FLOOD-RELATED LEGISLATION

JUNE, 1982 SESSION

Substitute Senate Bill No. 1001

PUBLIC ACT NO. 82-1

AN ACT CONCERNING THE AUTHORIZATION OF BONDS OF THE STATE FOR FLOOD RELIEF PURPOSES.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. The state bond commission may authorize the issuance of bonds of the state in accordance with the provisions of sections 1 to 10, inclusive, of this act, in one or more series and in principal amounts necessary to carry out the purposes of this act, but not in excess of the aggregate amount of thirty million dollars.

Sec. 2. The proceeds of the sale of bonds, to the extent hereinafter stated, shall be used for the following purposes:

(a) For the department of housing: For the low-interest flood relief housing loan fund, established under section 3 of this act, to provide loans for reconstruction, replacement, restoration and rehabilitation of dwelling units damaged or destroyed as a result of the flood waters and related occurrences from June 4, 1982, to June 7, 1982, inclusive, not exceeding five million dollars.

(b) For the department of economic development: For the low-interest loan program, established under section 5 of this act, to provide loans to business concerns, including agricultural concerns, for repair, reclamation or replacement of machinery, equipment, real property and improvements thereon, and inventory or crops which are damaged, destroyed or otherwise adversely affected by an emergency or disaster, which emergency or disaster has been proclaimed by the governor under the laws of this state, not exceeding five million dollars.

(c) For the state and local shares of federal public assistance under the Presidential Disaster Declaration of June 14, 1982, or any amendments thereto, and for amounts equivalent to such state and local shares in the case of state and town owned property, damaged or destroyed by flood waters and related occurrences from June 4, 1982 to June 7, 1982, inclusive, which is not located within the area of the state to which said Presidential declaration is applicable, not exceeding twenty million dollars.

Sec. 3. (NEW) (a) There is established a low-interest flood relief housing loan fund to provide low cost loans for reconstruction,

Substitute Senate Bill No. 1001

replacement, restoration and rehabilitation of dwelling units damaged or destroyed as a result of flood waters and related occurrences from June 4, 1982, to June 7, 1982, inclusive.

(b) The commissioner of housing shall adopt regulations in accordance with the provisions of chapter 54 of the general statutes which shall establish loan procedures, repayment terms, security requirements, default and remedy provisions and such other terms and conditions as the commissioner deems appropriate to carry out the purposes of subsection (a) of this section, provided no loan shall be made to any applicant unless the commissioner first determines that such applicant is unable to obtain sufficient assistance through programs of the federal government and in the opinion of the commissioner, such applicant will be unable to properly finance such reconstruction, replacement, restoration or rehabilitation, as may be necessary, without state assistance. The commissioner shall charge and collect interest on each loan at a rate not to exceed one per cent above the rate of interest borne by the bonds of the state last issued prior to the date such loan is awarded.

(c) If the commissioner adopts regulations in accordance with the provisions of subsection (b) of section 4-168 of the general statutes, notwithstanding the provisions of said section, the regulations may be submitted to the standing legislative regulation review committee not later than three days prior to the proposed effective date of such regulations.

(d) Any administrative expenses incurred in carrying out the provisions of this section to the extent not paid by the department of housing, or from monies appropriated for such purpose, shall be paid from the loan fund established under this section, provided the total administrative expenses paid from the fund may not exceed one per cent of the total of the loans made from the fund.

Sec. 4. Subsection (c) of section 16a-43 of the general statutes is repealed and the following is substituted in lieu thereof:

(c) To carry out the purposes of this section, the state bond commission shall have the power, from time to time but not later than June 30, 1980, to authorize the issuance of bonds of the state in one or more series and in principal amounts not exceeding in the aggregate three million dollars. The proceeds of the sale of said

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bonds [shall be] deposited in the small home heating oil dealers' loan fund created under this section SHALL BE TRANSFERRED TO THE BUSINESS EMERGENCY RELIEF LOAN FUND, SUBJECT TO THE PROVISIONS OF SUBSECTION (f) OF SECTION 16a-43, AS AMENDED BY SECTION 5 OF THIS ACT. All provisions of section 3-20 or the exercise of any right or power granted thereby which are not inconsistent with the provisions of this section are hereby adopted and shall apply to all bonds authorized by the state bond commission pursuant to this section, and temporary notes in anticipation of the money to be derived from the sale of any such bonds so authorized may be issued in accordance with said section 3-20 and from time to time renewed. Said bonds shall mature at such time or times not exceeding twenty years from their respective dates as may be provided in or pursuant to the resolution or resolutions of the state bond commission authorizing such bonds. Said bonds issued pursuant to this section shall be general obligations of the state and the full faith and credit of the state of Connecticut are pledged for the payment of the principal of and interest on said bonds as the same become due, and accordingly and as part of the contract of the state with the holders of said bonds, appropriation of all amounts necessary for punctual payment of such principal and interest is hereby made, and the treasurer shall pay such principal and interest as the same become due.

Sec. 5. Section 16a-43 of the general statutes is amended by adding subsections (d), (e), (f) and (g) as follows:

(NEW) (d) A business emergency relief revolving loan fund, to be held in trust by the state treasurer, is created. The state, acting through the commissioner of economic development, may provide loans from said fund to business concerns, including agricultural concerns, for repair, reclamation or replacement of machinery, equipment, real property and improvements thereon, and inventory or crops which are damaged, destroyed or otherwise adversely affected by an emergency or disaster, which emergency or disaster has been proclaimed by the governor under the laws of this state, provided (1) any such business concern is unable to obtain sufficient assistance through programs of the federal government, or in the event thirty days or more have elapsed since such business submitted application for assistance

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under a program of the federal government and such application has not been acted upon, (2) such business concern applies to the department for such loan within one year of the date of the governor's proclamation of such emergency or disaster and (3) in the opinion of the commissioner, such business concern will be unable to properly finance such expenses without state assistance. The commissioner shall charge and collect interest on each such loan at a rate not to exceed one per cent above the rate of interest borne by the bonds of the state last issued prior to the date such loan is awarded, except that, if such rate is lower than the rate charged by the Federal Small Business Administration for loans provided under its economic dislocation loan program, then to the extent permitted by federal tax law requirements the Federal Small Business Administration rate shall be charged and collected. In no event shall the total amount of such loan provided by the state to any single business concern for relief from any one proclaimed disaster or emergency exceed five hundred thousand dollars. The term for repayment of any loan allowed under this section shall not exceed ten years, provided that no loan shall be made the term of which ends later than October 1, 1993. Payments made by small business concerns on all such loans shall be paid to the treasurer and deposited by the treasurer in the small business emergency relief fund, and such payments shall be used to make additional loans. The commissioner may enter into agreements with lending institutions to administer provision of such loans in accordance with the provisions of this section. The commissioner shall adopt regulations in accordance with the provisions of chapter 54 which shall establish loan procedures, repayment terms, security requirements, default and remedy provisions and such other terms and conditions as the commissioner shall deem appropriate to carry out the purposes of this section. The program of loans and the business emergency relief revolving loan fund established under this section shall terminate not later than October 1, 1993 and the assets of said fund as of October 1, 1993, shall be transferred by the state treasurer to a special sinking fund. Said amount plus any interest earned thereon shall be used in payment of debt service of the state in addition to amounts otherwise appropriated for such purpose.

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(NEW) (e) Each such loan shall be authorized by the Connecticut development authority or, if the authority so determines, by a committee of the authority consisting of the chairman and either one other member of the authority or its executive director, as specified in the determination of the authority. Any administrative expenses incurred in carrying out the provisions of this section, to the extent not paid by the authority or from monies appropriated to the department, shall be paid from the business emergency relief revolving loan fund, provided total administrative expenses paid from said fund may not exceed one per cent of the total of such loans, and provided further, if approved by the commissioner of economic development for purposes of such administrative expenses, payment of a charge in the amount of one-half of one per cent of the amount of any such loan may be required from the recipient of such loan. Payments from said fund to business concerns or to pay such administrative expenses shall be made by the treasurer upon certification by the commissioner of economic development that the payment is authorized under the provisions of this section, under the applicable rules and regulations adopted under subsection (d) of this section, and, if made to a business concern, under the terms and conditions established by the authority or the duly appointed committee thereof in authorizing the making of the loan.

(NEW) (f) It is hereby determined that the small home heating oil dealers' revolving loan fund is no longer necessary in the public interest to carry out the purposes for which it was established. The commissioner of economic development shall prepare a certificate showing all loans and encumbrances against said fund and file such certificate with the secretary of the office of policy and management. As of the date of such filing all assets then held to the credit of the small home heating oil dealers' revolving loan fund created under subsection (a) of section 16a-43 shall be transferred to the business emergency relief revolving loan fund established under subsection (d) of section 16a-43, as amended by this section, except to the extent of loans and encumbrances listed in the certificate of the commissioner of economic development filed in accordance with this subsection.

(NEW) (g) If the commissioner adopts regulations under subsection (d) of section 16a-

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43, as amended by this section, in accordance with the provisions of subsection (b) of section 4-168 of the general statutes, notwithstanding the provisions of said section 4-168, the regulations may be submitted to the standing legislative regulation review committee not later than three days prior to the proposed effective date of such regulations.

Sec. 6. All provisions of section 3-20 of the general statutes or the exercise of any right or power granted thereby which are not inconsistent with the provisions of this act are hereby adopted and shall apply to all bonds authorized by the state bond commission pursuant to sections 1 to 10, inclusive, of this act, and temporary notes in anticipation of the money to be derived from the sale of any such bonds so authorized may be issued in accordance with said section and from time to time renewed. Such bonds shall mature at such time or times not exceeding twenty years from their respective dates as may be provided in or pursuant to the resolution or resolutions of the state bond commission authorizing such bonds.

Sec. 7. None of said bonds shall be authorized except upon a finding by the state bond commission that there has been filed with it a request for such authorization, which is signed by the secretary of the office of policy and management or by or on behalf of such state officer, department or agency and stating such terms and conditions as said commission, in its discretion, may require.

Sec. 8. For the purposes of sections 1 to 10, inclusive, of this act, "state moneys" means the proceeds of the sale of bonds authorized pursuant to said sections 1 to 10, inclusive, of this act or of temporary notes issued in anticipation of the moneys to be derived from the sale of such bonds. Each request filed as provided in section 7 of this act for an authorization of bonds shall identify the purpose or project for which the proceeds of the sale of such bonds are to be used and expended and, in addition to any terms and conditions required pursuant to said section 7, include the recommendation of the person signing such request as to the extent to which federal, private or other moneys then available or thereafter to be made available for costs in connection with any such project should be added to the state moneys

available or becoming available hereunder for such project. If the request includes a recommendation that some amount of such federal, private or other moneys should be added to such state moneys, then, if and to the extent directed by the state bond commission at the time of authorization of such bonds, said amount of such federal, private or other moneys then available or thereafter to be made available for costs in connection with such project may be added to any state moneys available or becoming available hereunder for such project and be used for such project, any other federal, private or other moneys then available or thereafter to be made available for costs in connection with such project upon receipt shall, in conformity with applicable federal and state law, be used by the treasurer to meet principal of outstanding bonds issued pursuant to sections 1 to 10, inclusive, of this act, or to meet the principal of temporary notes issued in anticipation of the money to be derived from the sale of bonds theretofore authorized pursuant to said sections for the purpose of financing such costs, either by purchase or redemption and cancellation of such bonds or notes or by payment thereof at maturity. Whenever any of the federal, private or other moneys so received with respect to such project are used to meet principal of such temporary notes or whenever principal of any such temporary notes is retired by application of revenue receipts of the state, the amount of bonds theretofore authorized in anticipation of which such temporary notes were issued, and the aggregate amount of bonds which may be authorized pursuant to section 1 of this act, shall each be reduced by the amount of the principal so met or retired. Pending use of the federal, private or other moneys so received to meet principal as hereinabove directed, the amount thereof may be invested by the treasurer in bonds or obligations of, or guaranteed by, the state or the United States or agencies or instrumentalities of the United States, and shall be deemed to be part of the debt retirement funds of the state, and net earnings on such investments shall be used in the same manner as the said moneys so invested.

Sec. 9. Any balance of proceeds of the sale of said bonds authorized for any purpose described in sections 2, 3, 4 and 5 of this act in excess of the cost thereof may be used for any other purpose described in said section if the state bond

Substitute Senate Bill No. 1001

commission shall so determine and direct. Any balance of proceeds of the sale of said bonds in excess of the costs of all the purposes described in said sections 2, 3, 4 and 5 shall be applied to the payment of debt service on and retirement of said bonds.

Sec. 10. The bonds issued pursuant to sections 1 to 10, inclusive, of this act shall be general obligations of the state and the full faith and credit of the State of Connecticut are pledged for the payment of the principal of and interest on said bonds as the same become due, and accordingly and as part of the contract of the state with the holders of said bonds, appropriation of all amounts necessary for punctual payment of such principal and interest is hereby made, and the treasurer shall pay such principal and interest as the same become due.

Sec. 11. Section 1 of special act 82-46 is amended to read as follows:

The state bond commission shall have power, in accordance with the provisions of sections 1 to 8, inclusive, of [this act] SPECIAL ACT 82-46, from time to time to authorize the issuance of bonds of the state in one or more series and in principal amounts not exceeding in the aggregate one hundred [sixteen] TWENTY million twenty-five thousand dollars.

Sec. 12. Subsection (e) of section 2 of special act 82-46 is amended to read as follows:

(e) For the Department of Environmental Protection: (1) Additional facilities, repairs and improvements to inland and shoreline recreational areas, not exceeding one million dollars; (2) [dam repairs] DAMS, INCLUDING BUT NOT LIMITED TO REPAIR, RESTORATION, RECONSTRUCTION, DEMOLITION OR REPLACEMENT OF AND RELATED DREDGING, including state-owned dams, AND A STUDY PURSUANT TO SECTION 13 OF THIS ACT, not exceeding FOUR MILLION five hundred thousand dollars; (3) watershed protection and flood control projects; (A) Fairview Avenue area, Hamden, not exceeding three hundred thousand dollars; (B) Morris Creek, New Haven, not exceeding fifty thousand dollars; (C) Birchwood Gardens area of West Haven, not exceeding fifty thousand dollars; (4) for enhancing the use and navigability and studying the hydroelectric potential of the Coginchaug River, not exceeding fifty thousand dollars; (5) for the replacement of bridges over Piper Brook, not exceeding one million five hundred thousand dollars; (6)

Substitute Senate Bill No. 1001

dredging equipment for use at Silver Lake, Meriden-Berlin, not exceeding one hundred fifty thousand dollars; (7) improvements to landfill site, Silver Sands State Park, not exceeding fifty thousand dollars; (8) grants-in-aid to municipalities for planning for solid waste heat recovery projects, not exceeding two hundred thousand dollars; (9) land acquisition and development at West Rock Ridge State Park, not exceeding five hundred thousand dollars.

Sec. 13. (NEW) The commissioner of environmental protection shall study the state's policies, procedures and resources related to planning for and ensuring the safety of public and private dams and shall report to the general assembly the results of the study no later than January 15, 1983. The study shall include: (1) An estimate of the number of public and private dams requiring repair, modification or removal; (2) a review of the function, environmental impact and public benefit of private dams in need of repair which pose a significant threat to public safety or which provide substantial public benefits; (3) a review of the adequacy of existing authorities, procedures, staffing and funding pertaining to dam safety, and (4) recommendations for improved dam safety regulation and alternative mechanisms for funding the repair or removal of public and private dams.

Sec. 14. This act shall take effect from its passage.

Certified as correct by

Legislative Commissioner.

Clerk of the Senate.

Clerk of the House.

Approved _____, 1982

Governor.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Sec. 210. Section 1 of public act 82-1 of the June, 1982 Special Session, is amended to read as follows:

The state bond commission may authorize the issuance of bonds of the state in accordance with the provisions of sections 1 to 10, inclusive, of [this act] PUBLIC ACT 82-1, in one or more series and in principal amounts necessary to carry out the purposes of this act, but not in excess of the aggregate amount of [thirty] FIVE million dollars.

Sec. 211 Section 2 of public act 82-1 of the June, 1982 Special Session, is amended to read as follows:

Senate Bill No. 2002

The proceeds of the sale of bonds, to the extent hereinafter stated, shall be used for the following purposes:

[(a) For the department of housing: For the low-interest flood relief housing loan fund, established under section 3 of this act, to provide loans for reconstruction, replacement, restoration and rehabilitation of dwelling units damaged or destroyed as a result of the flood waters and related occurrences from June 4, 1982, to June 7, 1982, inclusive, not exceeding five million dollars.

(b) For the department of economic development: For the low-interest loan program, established under section 5 of this act, to provide loans to business concerns, including agricultural concerns, for repair, replacement or replacement of machinery, equipment, real property and improvements thereon, and inventory or crops which are damaged, destroyed or otherwise adversely affected by an emergency or disaster, which emergency or disaster has been proclaimed by the governor under the laws of this state, not exceeding five million dollars.

(c)] For the state and local shares of federal public assistance under the Presidential Disaster Declaration of June 14, 1982, or any amendments thereto, and for amounts equivalent to such state and local shares in the case of [state and town owned] property, damaged or destroyed by flood waters and related occurrences from June 4, 1982 to June 7, 1982, inclusive, which is not located within the area of the state to which said Presidential declaration is applicable, not exceeding [twenty] FIVE million dollars.

Sec. 212. Section 3 of public act 82-1 of the

Senate Bill No. 2002

June, 1982 Special Session is repealed.

Sec. 213. This act shall take effect July 1, 1993.

Certified as correct by

Legislative Commissioner.

Clerk of the Senate.

Clerk of the House.

Approved _____, 1983

Governor.

JUNE SESSION, 1983

House Bill No. 8015

PUBLIC ACT NO. 83-38

AN ACT CONCERNING DAM SAFETY.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Section 1. Section 22a-409 of the general statutes is repealed and the following is substituted in lieu thereof:

(a) The commissioner shall cause a survey and maps to be made of each town showing the location of [such] ANY DAMS OR SIMILAR structures WITHIN SUCH TOWN, and shall file a copy of such map with the town clerk, [of each town.]

(b) THE OWNER OF ANY DAM OR SIMILAR STRUCTURE SHALL REGISTER ON OR BEFORE JULY 1, 1984, WITH THE COMMISSIONER OF ENVIRONMENTAL PROTECTION ON A FORM PRESCRIBED BY HIM, THE LOCATION AND DIMENSIONS OF SUCH DAM OR STRUCTURE AND SUCH OTHER INFORMATION AS THE COMMISSIONER MAY REQUIRE. THE FEE FOR REGISTRATION SHALL BE AS FOLLOWS: (1) DAMS OR SIMILAR STRUCTURES FIVE FEET OR MORE IN HEIGHT BUT LESS THAN FIFTEEN FEET, TWENTY-FIVE DOLLARS; (2) DAMS OR SIMILAR STRUCTURES FIFTEEN FEET OR MORE IN HEIGHT BUT LESS THAN TWENTY-FIVE FEET, FIFTY DOLLARS, AND (3) DAMS OR SIMILAR STRUCTURES TWENTY-FIVE FEET OR MORE IN HEIGHT, ONE HUNDRED DOLLARS. DAMS OR SIMILAR STRUCTURES LESS THAN FIVE FEET IN HEIGHT SHALL BE REGISTERED WITHOUT FEE. AS USED IN THIS SUBSECTION, "HEIGHT" MEANS THE VERTICAL DISTANCE FROM THE CREST OF A DAM OR SIMILAR STRUCTURE TO THE DOWNSTREAM TOE OF SUCH DAM OR SIMILAR STRUCTURE.

(c) THE COMMISSIONER SHALL PERIODICALLY INSPECT DAMS REGISTERED PURSUANT TO SUBSECTION (b) OF THIS SECTION. ANY DAM WHICH IMPOUNDS LESS THAN THREE ACRE-FEET OF WATER, AFTER AN INITIAL INSPECTION, SHALL BE EXEMPT FROM THE PROVISIONS OF THIS SUBSECTION EXCEPT UPON DETERMINATION BY THE COMMISSIONER THAT SUCH DAM POSES A UNIQUE HAZARD. THE COMMISSIONER SHALL ADOPT REGULATIONS IN ACCORDANCE WITH THE PROVISIONS OF CHAPTER 54 ESTABLISHING (1) A SCHEDULE FOR THE FREQUENCY OF INSPECTION OF DAMS, (2) THE INSPECTION FEES FOR REGULARLY SCHEDULED INSPECTIONS, SUFFICIENT TO COVER THE REASONABLE COST OF SUCH INSPECTIONS, AND (3) PROCEDURES FOR REGISTRATION AND CRITERIA FOR WAIVER OF REGISTRATION AND INSPECTION FEES.

Sec. 2. (NEW) The commissioner shall provide loans, in accordance with regulations adopted in accordance with the provisions of chapter 54 of the general statutes, for the repair of privately

House Bill No. 8015

owned dams which he has determined benefit the public. The amount of interest on any such loan shall be not more than one per cent above the amount of interest the state paid at the bond issue immediately preceding the loan. Such regulations shall include provisions for a lien against the property on which the dam is located, which lien shall have the same priority as a lien for state taxes.

Sec. 3. Section 22a-6 of the general statutes, as amended by section 1 of public act 83-555, is repealed and the following is substituted in lieu thereof:

The commissioner may (1) adopt, amend or repeal such environmental standards, criteria and regulations, and such procedural regulations as are necessary and proper to carry out his functions, powers and duties. No adoption, amendment or repeal of any standard, criterion or regulation shall take effect except after a public hearing, thirty days prior notice of the date, time, place and subject matter of which shall be published in the Connecticut Law Journal, or earlier than thirty days after the publication thereof in said law journal; (2) enter into contracts with any person, firm, corporation or association to do all things necessary or convenient to carry out the functions, powers and duties of the department; (3) initiate and receive complaints as to any actual or suspected violation of any statute, regulation, permit or order administered, adopted or issued by him. The commissioner shall have the power to hold hearings, administer oaths, take testimony and subpoena witnesses and evidence, enter orders and institute legal proceedings including, but not limited to, suits for injunctions, for the enforcement of any statute, regulation, order or permit administered, adopted or issued by him; (4) in accordance with regulations adopted by him, require, issue, renew, revoke, modify or deny permits, under such conditions as he may prescribe, governing all sources of pollution in Connecticut within his jurisdiction; (5) in accordance with constitutional limitations, enter at all reasonable times, without liability, upon any public or private property, except a private residence, for the purpose of inspection and investigation to ascertain possible violations of any statute, regulation, order or permit administered, adopted or issued by him and the

owner, managing agent or occupant of any such property shall permit such entry, and no action for trespass shall lie against the commissioner for such entry, or he may apply to any court having criminal jurisdiction for a warrant to inspect such premises to determine compliance with any statute, regulation, order or permit administered, adopted or enforced by him, provided any information relating to secret processes or methods of manufacture or production ascertained by the commissioner during, or as a result of any inspection, investigation, hearing or otherwise shall be kept confidential and shall not be disclosed except that such information may be disclosed by the commissioner to the United States Environmental Protection Agency pursuant to the Federal Freedom of Information Act of 1976, (5 USC 552) and regulations adopted thereunder; (6) undertake any studies, inquiries, surveys or analyses he may deem relevant, through the personnel of the department or in cooperation with any public or private agency, to accomplish the functions, powers and duties of the commissioner; (7) require the posting of sufficient performance bond or other security to assure compliance with any permit or order; (8) provide by notice printed on any form that any false statement made thereon or pursuant thereto is punishable as a criminal offense under section 53a-157; (9) [notwithstanding the provisions of section 4-131,] CONSTRUCT OR REPAIR OR CONTRACT FOR THE CONSTRUCTION OR REPAIR OF ANY DAM OR FLOOD AND EROSION CONTROL SYSTEM UNDER HIS CONTROL AND MANAGEMENT INVOLVING AN EXPENDITURE OF LESS THAN TWO HUNDRED FIFTY THOUSAND DOLLARS AND MAY make or contract for the making of any alteration, repair or addition to any real asset under his control and management, including rented or leased premises, involving an expenditure of [fifty] ONE HUNDRED thousand dollars or less, [provided any expenditure in excess of twenty-five thousand dollars shall be subject to the bidding procedures in section 4-132. In any action brought against any employee of the department acting within his scope of delegated authority in performing any of the above-listed duties, the employee shall be represented by the attorney general] AND MAY, WITH PRIOR APPROVAL OF THE COMMISSIONER OF ADMINISTRATIVE SERVICES, MAKE OR CONTRACT FOR THE MAKING OF ANY ALTERATION, REPAIR OR ADDITION TO SUCH OTHER REAL ASSET UNDER HIS CONTROL AND

MANAGEMENT INVOLVING AN EXPENDITURE OF MORE THAN ONE HUNDRED THOUSAND DOLLARS BUT NOT MORE THAN TWO HUNDRED FIFTY THOUSAND DOLLARS; AND (10) the commissioner may by regulations adopted in accordance with the provisions of chapter 54 require the payment of a fee sufficient to cover the reasonable cost of reviewing and acting upon an application for and monitoring compliance with the terms and conditions of any state or federal permit, license, order, certificate or approval required pursuant to subsection (i) of section 22a-39, subsections (c) and (d) of section 22a-96, subsections (h), (i) and (k) of section 25-54c, and sections 22a-32, 22a-342, 22a-345, 22a-361, 22a-384, 22a-403, 22a-416, 22a-428 to 22a-432, inclusive, and 22a-454. Such costs may include, but are not limited to the costs of (1) public notice, (2) reviews, inspections and testing incidental to the issuance of and monitoring of compliance with such permits, licenses, orders, certificates and approvals and (3) surveying and staking boundary lines. All funds received by the commissioner pursuant to this section and subsection (q) of section 22a-174, AS AMENDED BY SECTION 2 OF PUBLIC ACT 83-555, during the fiscal year ending June 30, 1983, shall be deposited in the general fund and credited to the appropriations of the department of environmental protection in accordance with the provisions of section 4-86, AS AMENDED BY PUBLIC ACT 83-310, and such funds shall not lapse until June 30, 1984. IN ANY ACTION BROUGHT AGAINST ANY EMPLOYEE OF THE DEPARTMENT ACTING WITHIN HIS SCOPE OF DELEGATED AUTHORITY IN PERFORMING ANY OF THE ABOVE-LISTED DUTIES, THE EMPLOYEE SHALL BE REPRESENTED BY THE ATTORNEY GENERAL.

Sec. 4. Section 25-85 of the general statutes is repealed and the following is substituted in lieu thereof:

Such board shall have authority, within the limits of appropriations from time to time made by the municipality, to plan, lay out, acquire, construct, reconstruct, repair, maintain, supervise and manage a flood or erosion control system. As used in sections 25-84 to 25-94, inclusive, "flood or erosion control system" means any dike, berm, DAM, piping, groin, jetty, sea wall, embankment, revetment, tide-gate, water storage area, ditch, drain or other structure or facility useful in preventing or ameliorating damage from floods or erosion, whether caused by

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fresh or salt water, OR ANY DAM FORMING A LAKE OR POND THAT BENEFITS ABUTTING PROPERTIES, and shall include any easements, rights-of-way and riparian rights which may be required in furtherance of any such system.

Certified as correct by

Legislative Commissioner.

Clerk of the Senate.

Clerk of the House.

Approved _____, 1983

Governor.

APPENDIX G

SOURCES OF INFORMATION ON THE JUNE 1982 FLOODS

1. BACKGROUND INFORMATION GATHERED TO PRODUCE THIS REPORT

The basic data gathered during preparation of this report will be turned over to the Connecticut Department of Environmental Protection, Natural Resources Center, Room 553, 165 Capitol Avenue, Hartford, Ct 06106. Final disposition of these files will be determined by NRC, which intends to provide permanent storage of the most essential information within DEP, the State Library or other appropriate locations. Examples of information included in these files are: maps of municipal damages and information on municipal responses for towns not included in the final report; more detailed information on losses by State agencies; approximately 500 newspaper articles; copies of flood-related reports; and originals of photographs used in the report (except ones which were loaned for use in the report).

2. INFORMATION ON FLOOD LOSSES

a. Initial Loss Estimates

Information on the initial flood losses reported by towns and state agencies is maintained by the Connecticut Office of Civil Preparedness, 360 Broad Street, Hartford, CT 06106.

b. Losses by State and Municipal Agencies and Non-Profit Organizations

Files on all damages to public and non-profit facilities, for which reimbursement of losses was sought, are maintained by the Connecticut Office of Policy and Management, Intergovernmental Relations Division, 80 Washington Street, Hartford, CT 06106. Included in these files are individual Damage Survey Reports, Project Applications, and all correspondence among the applicant, OPM and FEMA. OPM files are divided by northern and southern counties. OPM has the original files for all towns in the northern counties (State assistance only), and copies of files for all towns in the southern counties (State and FEMA assistance).

The original Damage Survey Reports (including originals of photographs) and Project Applications are maintained by FEMA, Region I, Disaster Assistance Division, J.W. McCormack Post Office and Court House, Boston, MA 02109.

Damage Survey Report files for roads and bridges are also maintained by the Connecticut Department of Transportation. DSR's for damaged State and municipal roads and bridges on the Federal-Aid Highway System are maintained by the DOT, Bureau of Highways, 17 Van Dyke Street, Hartford, CT 06106. DSR's for State roads and bridges not on the Federal-Aid Highway System are maintained by DOT, Bureau of Highways, 24 Wolcott Hill Road, Wethersfield, CT 06109.

c. Business Losses

Estimates of damages to businesses are maintained by the Connecticut Department of Economic Development, Technical Services Division, 210 Washington Street,

Hartford, CT 06106. The Connecticut Development Authority, 217 Washington Street, Hartford, CT 06106 has information on disaster loans to businesses. Information on individual businesses is confidential.

Information on disaster loans to businesses by SBA is maintained by the U.S. Small Business Administration, District Office, 1 Hartford Square West, Hartford, CT 06106.

d. Individual Losses

Information on the Temporary Housing Program and Limited Home Repairs is maintained by the Connecticut Department of Housing, 1179 Main Street, Hartford, CT 06101. Information on individuals is confidential.

Information on the Individual and Family Grant Program is maintained by the Connecticut Department of Income Maintenance, 110 Bartholomew Avenue, Hartford, CT 06106. Information on individuals is confidential.

e. Agricultural Losses

Information on agricultural losses is available from the U.S. Agricultural Stabilization and Conservation Service, 135 High Street, Hartford, CT 06106, and the Federal Crop Insurance Corporation, 670 Main Street, Lower Level, Willimantic, CT 06226.

f. Dams

Information on State, municipal and private dams is available from the Connecticut Department of Environmental Protection, Water Resources Unit, Room 211, 165 Capitol Avenue, Hartford, CT 06106.

g. Stream Channels

Information on emergency stream improvements is available from the U.S. Soil Conservation Service, Mansfield Professional Park, Storrs, CT 06268.

3. HYDROLOGY AND METEOROLOGY

a. Meteorology

Additional details on the storm event and on rainfall are available from the National Weather Service, Northeast River Forecast Center, 705 Bloomfield Avenue, Bloomfield, CT 06002.

b. Hydrology

Additional hydrologic information on individual rivers and streams is available from several sources: The Northeast River Forecast Center, 705 Bloomfield Avenue, Bloomfield, CT 06002 has information on discharges from several major rivers; the U.S. Geological Survey, Water Resources Division, 450 Main Street, Room 525, Hartford, CT 06103, has more detailed information on stream discharges at all gage sites and selected other locations; the DEP, Water Resources Unit, Room 211, 165 Capitol Avenue, Hartford, CT 06106 has information on post-flood studies of streams and basins, and can direct the interested individual to other agencies such as the Soil

Conservation Service, Corps of Engineers, and FEMA, Flood Insurance Administration, for more detailed information on individual studies, as appropriate.

4. SPECIAL REPORTS

Disaster Survey Report, June 5-7, 1982, Southern New England Flood. NWS, Eastern Region Headquarters, Feb. 1983. Available from the National Weather Service, Eastern Region Headquarters, 585 Stewart Avenue, Garden City, Long Island, NY 11530.

Briefing Document on the Federal Emergency Management Agency's and the Small Business Administration's Administration of Disaster Assistance in the Connecticut Disaster. Prepared for Congressman San Gejdenson and Senator Christopher Dodd by the U.S. General Accounting Office, 12/3/82. Available from the U.S. General Accounting Office, Document Handling and Information Services Facility, P.O. Box 6015, Gaithersburg, MD 20760.

Interagency Flood Hazard Mitigation Report, in Response to the June 14, 1982 Disaster Declaration (FEMA 661-DR-CT). Region I Interagency Flood Hazard Mitigation Team, June 29, 1982; and Interagency Post-flood Progress Report, in Response to the June 14, 1982 Disaster Declaration (FEMA 661-DR-CT). Region I Interagency Flood Hazard Mitigation Team, October 15, 1982. Both reports available from the CT DEP, Water Resources Unit, Room 211, 165 Capitol Avenue, Hartford, CT 06106, and the Federal Emergency Management Agency, Region I, J.W. McCormack Post Office and Court House, Boston, MA 02109.

Section 406 Hazard Mitigation Implementation Measures. State of Connecticut, August 1983. Available from the CT DEP, Natural Resources Center, Room 553, 165 Capitol Avenue, Hartford, CT 06106.

Project H₂O: Help to Others in Connecticut. Final Report, 1983. Dr. Joseph M. Torres, et al. Available from the Regional Director, CT Department of Mental Health, Region III, Norwich Hospital, Russell Building, Norwich, CT 06360.

5. PHOTOGRAPHS, VIDEOTAPES, AND NEWS ARTICLES

a. Videotape

A 3/4 inch videotape of news and special events coverage by television stations WFSB-TV (Channel 3), WTNH-TV (Channel 8), and WVIT-TV (Channel 30) for the period June 5, 6, and 7, is available for viewing at the NWS, Northeast River Forecast Center, 705 Bloomfield Avenue, Bloomfield, CT 06002. The videotape was assembled for NERFC by New England News Watch, Five Auburn Street, Framingham, MA 01701.

b. Slides and Photographs

The CT DEP, Water Resources Unit has two slide shows dealing with the June 1982 floods. One is titled "Connecticut's June 1982 Flood: Post-Disaster Response" and is entirely devoted to the June 1982 floods. The other deals with dam safety and uses slides of dam failures and damages during the June 1982 floods to illustrate dam safety issues. Both slide shows are available for viewing by contacting the CT DEP, Water Resources Unit, Room 211, 165 Capitol Avenue, Hartford, CT 06106.

The Connecticut Water Company, 93 West Main Street, Clinton, CT 06413, has a slide show on the effect of the June 1982 floods on Connecticut Water Company property and facilities. This slide show was prepared by Kenneth Kells for presentation at the November 1982 meeting of the American Water Works Association.

The CT DOT has a collection of about 200 slides showing damages to State roads and bridges. These are available for viewing at the CT Department of Transportation, Bureau of Highways, 24 Wolcott Hill Road, Wethersfield, CT 06109. DOT also has a collection of black and white photographs showing damages to State roads and bridges. These photographs are available for viewing through the same DOT office.

The Soil Conservation Service has several hundred slides showing damages to stream channels, the process of restoration, and restored stream channels. These slides are available for viewing at the Soil Conservation Service, Mansfield Professional Park, Storrs, Connecticut 06268. Additional slides are also available from District Conservationists at each of the county Soil and Water Conservation Districts.

Many of the towns also have some black and white photographs, slides, and color photographs. Several newspapers have good selections of black and white photographs, but each newspaper must be contacted to determine availability of (and charge for) individual photographs.

Photographs of damages to public property are included with most Damage Survey Reports maintained by OPM and FEMA. Most of these photographs are instant color prints. The OPM files contain only photocopies of the originals, and are generally of very poor quality. The original photos are with the DSR files maintained by FEMA.

d. Aerial Photographs

A set of low-altitude aerial photographs covering most of the areas of greatest flooding is available from Aerial Data Reduction Associates, Inc., 9285 Commerce Highway, P.O. Box 557, Pennsauken, NJ 08110. These photographs were taken at or near the time of peak flooding. They are not of mapping quality, but show the extent of flooding in many areas.

c. Newspaper Articles

The background files for this report include approximately 500 newsclippings (and photographs) from June 5, 1982 through the fall of 1983. These articles were gathered directly by L.R. Johnston Associates or obtained from several State and Federal agencies, towns, and businesses. The two largest individual files of newsclippings were collected by the NWS, Northeast River Forecast Center, 705 Bloomfield Avenue, Bloomfield, CT 06002 (covering mainly June and July 1982), and the CT DEP, Office of Planning and Coastal Area Management (covering mainly coastal communities from June 1982 through June 1983).

APPENDIX H

ABBREVIATIONS USED IN THE REPORT

ALERT	Automated Local Evaluation in Real Time
ASCS	Agricultural Stabilization and Conservation Service, U.S. Dept. of Agriculture
CDA	Connecticut Development Authority, State of CT
COE	Corps of Engineers, Department of the Army
DAC	Disaster Assistance Center
DED	Department of Economic Development, State of CT
DEP	Department of Environmental Protection, State of CT
DFO	Disaster Field Office
DIM	Department of Income Maintenance, State of CT
DMH	Department of Mental Health, State of CT
DOH	Department of Housing, State of CT
DOL	Department of Labor, State of CT
DOT	Department of Transportation, State of CT
DSR	Damage Survey Report
DUA	Disaster Unemployment Assistance
EOC	Emergency Operations Center
EPA	Environmental Protection Agency, U.S.
FEMA	Federal Emergency Management Agency, U.S.
FHWA	Federal Highway Administration, U.S. Department of Transportation
FIA	Federal Insurance Administration, FEMA
HUD	Department of Housing and Urban Development, U.S.
IFG	Individual and Family Grant Program
IRS	Internal Revenue Service, U.S.
LHR	Limited Home Repair
NAWAS	National Warning System
NERFC	Northeast River Forecast Center, U.S. Dept. of Commerce, NOAA, National Weather Service
NEIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration, U.S. Dept. of Commerce
NWS	National Weather Service, U.S. Dept. of Commerce, NOAA
OCP	Office of Civil Preparedness, State of CT
OPM	Office of Policy and Management, State of CT
QPF	Quantative Precipitation Forecast
SBA	Small Business Administration
SCS	Soil Conservation Service, U.S. Dept. of Agriculture
SNET	Southern New England Telephone Company
USGS	Geological Survey, U.S. Dept. of Interior
WRU	Water Resources Unit, CT Dept. of Environmental Protection
WSFO	Weather Service Field Office, U.S. Dept. of Commerce, NOAA, National Weather Service
WSO	Weather Service Office, U.S. Dept. of Commerce, NOAA, National Weather Service

CHRONOLOGY OF SIGNIFICANT EVENTS

JUNE 16

- o FEMA opened Disaster Field Office in Middletown
- o Governor called for Special Session of Legislature

JUNE 18

- o FEMA opened Disaster Assistance Centers in Essex, Hamden, Milford, Naugatuck, New London and Norwich, which remained open until June 24

JUNE 21

- o Mobile Disaster Assistance Centers began visiting northern counties
- o Governor ordered contractors working on damaged State highway bridges to begin working 10-hour days and seven-day weeks

JUNE 22

- o Governor sent supplemental request to FEMA requesting towns in the four northern counties be declared eligible for Public Assistance

JUNE 28

- o FEMA opened Disaster Service Centers in Essex, Hamden, and West Haven, which remained open until July 17

JUNE 30, JULY 1

- o Legislature passed and the Governor signed special flood relief legislation (PA 82-1, June Special Session)

JULY 8

- o FEMA rejected Governor's request for extension of public assistance to northern counties

JULY 23

- o State Bond Commission approved \$34.4 million bond issue for flood relief

AUGUST 13

- o Deadline for individuals and businesses to file applications for most forms of Federal assistance

JUNE 1983

- o One year after the flood most recovery actions were completed, but permanent repairs or replacement of several local and state bridges remained, minor roadway and culvert repairs remained in several towns, and a few families were still in temporary housing

COVER PHOTOGRAPH CREDITS

(Clockwise from upper left)

Front Cover

Route 82 in Haddam, courtesy of CT Dept. of Transportation (DOT)

Menunketesuck River at Route 145 in Westbrook, courtesy of DOT

Deep River, Bushy Hill Dam, courtesy of CT DEP, Water Resources Unit (WRU)

Cheney Street area in Essex, courtesy of CT DEP, WRU

Back Cover

Cheney Street area in Essex, courtesy of CT, DEP, WRU

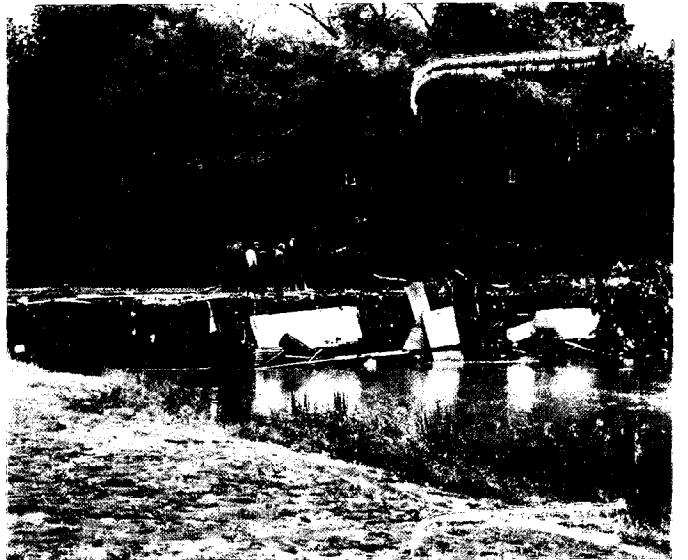
Washed out bridge on Route 161 in East Lyme, courtesy of CT DOT

Walnut Street bridge in Essex, courtesy of CT DEP, WRU

Norwichtown Mall, Yantic River, Norwich, courtesy of CT DEP, WRU

Old Route '32 in Franklin, courtesy of CT DEP, WRU

Route 27 in Old Mystic, courtesy of CT DOT



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